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Note: Addenda information is NOT included with the electronic documents available via electronic file transfer. Only bidder or non-bidder package holders listed with the Caltrans Plans and Bid Documents section as described above will receive addenda information.



STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS
AND
SPECIAL PROVISIONS
FOR HIGHWAY PLANTING ON STATE HIGHWAY IN
RIVERSIDE COUNTY IN LAKE ELSINORE FROM FRANKLIN STREET
OVERCROSSING TO WASSON CANYON WASH

DISTRICT 08, ROUTE 15

For Use in Connection with Standard Specifications Dated JULY 1995, Standard Plans Dated JULY 1997, and Labor Surcharge and Equipment Rental Rates.

CONTRACT NO. 08-003114

08-Riv-15-32.0/34.6

Bids Open: June 29, 2000
Dated: May 22, 2000

IMPORTANT SPECIAL NOTICES

- Attention is directed to Section 3 of the Special Provisions, regarding award of contract. The periods of time specified in Section 3-1.01, "Award of Contract," of the Standard Specifications, within which award of contract may be made have been extended for this contract.

SPECIAL NOTICE

Caltrans is conducting a pilot program in cooperation with Surety 2000, to test electronic bond verification systems. The purpose of the pilot program is to test the use of Surety 2000 for verifying a bidder's bond electronically.

Surety 2000 is an Internet-based surety verification and security system, developed by the surety industry. Surety agents may contact Surety 2000 at 1-800-660-3263.

Bidders are encouraged to participate in the pilot program. To participate, the bidder is asked to provide the "Authorization Code" provided by Surety 2000, on a separate sheet, together with the standard bidder's bond required by the specifications. The bidder's surety agent may obtain the "Authorization Code" from Surety 2000.

The Department will use the "Authorization Code" to access the Surety 2000 database, and independently verify the actual bidder's bond and document the functioning of the Surety 2000 system.

"Authorization Codes" will be used only to verify bidder's bonds, and only as part of the pilot program. The use of "Authorization Codes" will not be accepted in lieu of the bidder's bond or other bidder's security required in the specifications during the pilot study.

The function of the Surety 2000 system is to provide an easier way for Contractors to protect their bid security, and to discourage fraud. This system is available to all California admitted sureties and surety agents.

The results of the pilot study will be tabulated, and at some time in the future, the Department may consider accepting electronic bidder's bond verification in lieu of the bidder's bond specified.

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STANDARD PLANS LIST

The Standard Plan sheets applicable to this contract include, but are not limited to those indicated below. The Revised Standard Plans (RSP) and New Standard Plans (NSP) which apply to this contract are included as individual sheets of the project plans.

A10A	Abbreviations
A10B	Symbols
A20A	Pavement Markers and Traffic Lines - Typical Details
H1	Planting and Irrigation - Abbreviations
<i>RSP H2</i>	<i>Planting and Irrigation - Symbols</i>
H3	Planting and Irrigation - Details
H4	Planting and Irrigation - Details
H5	Planting and Irrigation - Details
H6	Planting and Irrigation - Details
H7	Planting and Irrigation - Details
H8	Planting and Irrigation - Details
<i>NSP T1A</i>	<i>Temporary Crash Cushion, Sand Filled (Unidirectional)</i>
<i>NSP T1B</i>	<i>Temporary Crash Cushion, Sand Filled (Bidirectional)</i>
<i>RSP T2</i>	<i>Temporary Crash Cushion, Sand Filled (Shoulder Installations)</i>
<i>RSP T7</i>	<i>Construction Project Information Signs</i>
T10	Traffic Control System for Lane Closure On Freeways and Expressways
RS1	Roadside Signs - Typical Installation Details No. 1
RS2	Roadside Signs - Wood Post, Typical Installation Details No. 2
ES-1A	Signal, Lighting and Electrical Systems - Symbols and Abbreviations
ES-1B	Signal, Lighting and Electrical Systems - Symbols and Abbreviations
ES-4D	Irrigation Controller Enclosure Cabinet
ES-8	Signal, Lighting and Electrical Systems - Pull Box Details
ES-13	Signal, Lighting and Electrical Systems - Splicing Details

DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS

CONTRACT NO. 08-003114

08-Riv-15-32.0/34.6

Sealed proposals for the work shown on the plans entitled:

**STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROJECT PLANS FOR HIGHWAY
PLANTING ON STATE HIGHWAY IN RIVERSIDE COUNTY IN LAKE ELSINORE FROM FRANKLIN
STREET OVERCROSSING TO WASSON CANYON WASH**

will be received at the Department of Transportation, 3347 Michelson Drive, Suite 100, Irvine, CA 92612-1692, until 2 o'clock p.m. on June 29, 2000, at which time they will be publicly opened and read in Room C - 1116 at the same address.

Proposal forms for this work are included in a separate book entitled:

**STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROPOSAL AND CONTRACT FOR
HIGHWAY PLANTING ON STATE HIGHWAY IN RIVERSIDE COUNTY IN LAKE ELSINORE FROM
FRANKLIN STREET OVERCROSSING TO WASSON CANYON WASH**

General work description: Highway planting and irrigation.

This project has a goal of 3 percent disabled veteran business enterprise (DVBE) participation.

No prebid meeting is scheduled for this project.

Bids are required for the entire work described herein.

At the time this contract is awarded, the Contractor shall possess either a Class A license or a Class C-27 license.

The Contractor must also be properly licensed at the time the bid is submitted, except that on a joint venture bid a joint venture license may be obtained by a combination of licenses after bid opening but before award in conformance with Business and Professions Code, Section 7029.1.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990.

Preference will be granted to bidders properly certified as a "Small Business" as determined by the Department of General Services, Office of Small Business Certification and Resources at the time of bid opening in conformance with the provisions in Section 2-1.05, "Small Business Preference," of the special provisions, and Section 1896 et seq, Title 2, California Code of Regulations. A form for requesting a "Small Business" preference is included with the bid documents. Applications for status as a "Small Business" must be submitted to the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814, Telephone No. (916) 322-5060.

A reciprocal preference will be granted to "California company" bidders in conformance with Section 6107 of the Public Contract Code. (See Sections 2 and 3 of the special provisions.) A form for indicating whether bidders are or are not a "California company" is included in the bid documents and is to be filled in and signed by all bidders.

Project plans, special provisions, and proposal forms for bidding this project can only be obtained at the Department of Transportation, Plans and Bid Documents, Room 0200, MS #26, Transportation Building, 1120 N Street, Sacramento, California 95814, FAX No. (916) 654-7028, Telephone No. (916) 654-4490. Use FAX orders to expedite orders for project plans, special provisions and proposal forms. FAX orders must include credit card charge number, card expiration date and authorizing signature. Project plans, special provisions, and proposal forms may be seen at the above Department of Transportation office and at the offices of the District Directors of Transportation at Irvine, Oakland, and the district in which the work is situated. Standard Specifications and Standard Plans are available through the State of California, Department of Transportation, Publications Unit, 1900 Royal Oaks Drive, Sacramento, CA 95815, Telephone No. (916) 445-3520.

Cross sections for this project are not available.

The successful bidder shall furnish a payment bond and a performance bond.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated, and available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>. Future effective general prevailing wage rates which have been predetermined and are on file with the Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

DEPARTMENT OF TRANSPORTATION

Deputy Director Transportation Engineering

Dated May 22, 2000

TSM

COPY OF ENGINEER'S ESTIMATE
(NOT TO BE USED FOR BIDDING PURPOSES)

08-003114

Item	Item Code	Item	Unit of Measure	Estimated Quantity
1	074019	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM
2	074020	WATER POLLUTION CONTROL	LS	LUMP SUM
3 (S)	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM
4	200002	ROADSIDE CLEARING	LS	LUMP SUM
5	017985	DECOMPOSED GRANITE	M2	1280
6	200114	ROCK BLANKET	M2	1750
7	202011	MULCH	M3	400
8	204009	PLANT (GROUP I)	EA	5610
9	204035	PLANT (GROUP A)	EA	4760
10	204036	PLANT (GROUP B)	EA	590
11	204038	PLANT (GROUP U)	EA	70
12	204053	WILD FLOWER SEEDING	M2	4730
13	204099	PLANT ESTABLISHMENT WORK	LS	LUMP SUM
14	205061	ROOT PROTECTOR	EA	300
15	206560	CONTROL AND NEUTRAL CONDUCTORS	LS	LUMP SUM
16	206611	25 MM ELECTRIC REMOTE CONTROL VALVE	EA	9
17	206613	40 MM ELECTRIC REMOTE CONTROL VALVE	EA	40
18	206614	50 MM ELECTRIC REMOTE CONTROL VALVE	EA	5
19	017986	75 MM ELECTRIC REMOTE CONTROL VALVE (MASTER)	EA	2
20	017987	32 STATION FIELD UNIT (WALL MOUNTED)	EA	2

Contract No. 08-003114

Item	Item Code	Item	Unit of Measure	Estimated Quantity
21	017988	BASE STATION	EA	1
22	208022	65 MM GALVANIZED STEEL PIPE (SUPPLY LINE)	M	6
23 (F)	208249	20 MM PLASTIC PIPE (PR 200) (SUPPLY LINE)	M	4460
24 (F)	208250	25 MM PLASTIC PIPE (PR 200) (SUPPLY LINE)	M	2431
25 (F)	208251	32 MM PLASTIC PIPE (PR 200) (SUPPLY LINE)	M	2867
26 (F)	208252	40 MM PLASTIC PIPE (PR 200) (SUPPLY LINE)	M	1643
27 (F)	208253	50 MM PLASTIC PIPE (PR 200) (SUPPLY LINE)	M	2577
28 (F)	208254	65 MM PLASTIC PIPE (PR 200) (SUPPLY LINE)	M	3263
29 (F)	208255	75 MM PLASTIC PIPE (PR 200) (SUPPLY LINE)	M	60
30 (F)	208289	65 MM PLASTIC PIPE (PR 315) (SUPPLY LINE)	M	8
31 (F)	208291	75 MM PLASTIC PIPE (PR 315) (SUPPLY LINE)	M	869
32	208421	BACKFLOW PREVENTER ASSEMBLY ENCLOSURE	EA	2
33	208436	65 MM BACKFLOW PREVENTER ASSEMBLY	EA	2
34	208466	SPRINKLER (TYPE A-6)	EA	140
35	208467	SPRINKLER (TYPE A-7)	EA	50
36	208468	SPRINKLER (TYPE A-8)	EA	290
37	208482	SPRINKLER (TYPE C-2)	EA	500
38	208492	65 MM GATE VALVE	EA	1
39	208493	75 MM GATE VALVE	EA	15
40	017989	75 MM FLOW SENSOR	EA	2

Item	Item Code	Item	Unit of Measure	Estimated Quantity
41	208741	150 MM CORRUGATED STEEL PIPE CONDUIT (1.63 MM THICK)	M	13
42	017990	EXTEND 250 MM CORRUGATED STEEL PIPE CONDUIT (1.63 MM THICK)	M	10
43	208799	250 MM WELDED STEEL PIPE CONDUIT (6.35 MM THICK)	M	20
44 (S)	860640	IRRIGATION CONTROLLER ENCLOSURE CABINET	EA	2
45 (S)	860797	ELECTRIC SERVICE (IRRIGATION)	LS	LUMP SUM
46	999990	MOBILIZATION	LS	LUMP SUM

**STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION**

SPECIAL PROVISIONS

Annexed to Contract No. 08-003114

SECTION 1. SPECIFICATIONS AND PLANS

The work embraced herein shall conform to the provisions in the Standard Specifications dated July 1995, and the Standard Plans dated July 1997, of the Department of Transportation insofar as the same may apply, and these special provisions.

Amendments to the Standard Specifications set forth in these special provisions shall be considered as part of the Standard Specifications for the purposes set forth in Section 5-1.04, "Coordination and Interpretation of Plans, Standard Specifications and Special Provisions," of the Standard Specifications. Whenever either the term "Standard Specifications is amended" or the term "Standard Specifications are amended" is used in the special provisions, the indented text following said term shall be considered an amendment to the Standard Specifications. In case of conflict between such amendments and the Standard Specifications, the amendments shall take precedence over and be used in lieu of the conflicting portions.

In case of conflict between the Standard Specifications and these special provisions, the special provisions shall take precedence over and be used in lieu of the conflicting portions.

SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS

2-1.01 GENERAL

The bidder's attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions," of the Standard Specifications and these special provisions for the requirements and conditions which the bidder must observe in the preparation of the proposal form and the submission of the bid.

In addition to the subcontractors required to be listed in conformance with Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications, each proposal shall have listed therein the name and address of each DVBE subcontractor to be used for credit in meeting the goal, and to whom the bidder proposes to directly subcontract portions of the work. The list of subcontractors shall also set forth the portion of work that will be performed by each subcontractor listed. A sheet for listing the subcontractors is included in the Proposal.

The Bidder's Bond form mentioned in the last paragraph in Section 2-1.07, "Proposal Guaranty," of the Standard Specifications will be found following the signature page of the Proposal.

In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Proposal. Signing the Proposal shall also constitute signature of the Noncollusion Affidavit.

Submit request for substitution of an "or equal" item, and the data substantiating the request to the Department of Transportation, District 8 Construction, MS 1104, 464 West 4th Street, 6th Floor, San Bernardino, Ca 92401-1400, so that the request is received by the Department by close of business on the fourth day, not including Saturdays, Sundays and legal holidays, following bid opening.

2-1.02 DISABLED VETERAN BUSINESS ENTERPRISE (DVBE)

Section 10115 of the Public Contract Code requires the Department to implement provisions to establish a goal for Disabled Veterans Business Enterprise (DVBE) in contracts.

It is the policy of the Department that Disabled Veteran Business Enterprise (DVBE) shall have the maximum opportunity to participate in the performance of contracts financed solely with state funds. The Contractor shall ensure that DVBEs have the maximum opportunity to participate in the performance of this contract and shall take all necessary and reasonable steps for this assurance. The Contractor shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of subcontracts. Failure to carry out the requirements of this paragraph shall constitute a breach of contract and may result in termination of this contract or other remedy the Department may deem appropriate.

Bidder's attention is directed to the following:

- A. "Disabled Veteran Business Enterprise" (DVBE) means a business concern certified as a DVBE by the Office of Small Business Certification and Resources, Department of General Services.
- B. A DVBE may participate as a prime contractor, subcontractor, joint venture partner with a prime or subcontractor, or vendor of material or supplies.

- C. Credit for DVBE prime contractors will be 100 percent.
- D. A DVBE joint venture partner must be responsible for specific contract items of work, or portions thereof. Responsibility means actually performing, managing and supervising the work with its own forces. The DVBE joint venture partner must share in the ownership, control, management responsibilities, risks and profits of the joint venture. The DVBE joint venturer must submit the joint venture agreement with the Caltrans Bidder DVBE Information form required in Section 2-1.04, "Submission of DVBE Information," elsewhere in these special provisions.
- E. A DVBE must perform a commercially useful function, i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work.
- F. Credit for DVBE vendors of materials or supplies is limited to 60 percent of the amount to be paid to the vendor for the material unless the vendor manufactures or substantially alters the goods.
- G. Credit for trucking by DVBEs will be as follows:
 - 1. One hundred percent of the amount to be paid when a DVBE trucker will perform the trucking with his/her own trucks, tractors and employees.
 - 2. Twenty percent of the amount to be paid to DVBE trucking brokers who do not have a "certified roster."
 - 3. One hundred percent of the amount to be paid to DVBE trucking brokers who have signed agreements that all trucking will be performed by DVBE truckers if credit is toward the DVBE goal, a "certified roster" showing that all trucks are owned by DVBEs, and a signed statement on the "certified roster" that indicates that 100 percent of revenue paid by the broker will be paid to the DVBEs listed on the "certified roster."
 - 4. Twenty percent of the amount to be paid to trucking brokers who are not a DVBE but who have signed agreements with DVBE truckers assuring that at least 20 percent of the trucking will be performed by DVBE truckers if credit is toward the DVBE goal, a "certified roster" showing that at least 20 percent of the number of trucks are owned by DVBE truckers, and a signed statement on the "certified roster" that indicates that at least 20 percent of the revenue paid by the broker will be paid to the DVBEs listed on the "certified roster."

The "certified roster" referred to herein shall conform to the requirements in Section 2-1.04, "Submission Of DVBE Information," elsewhere in these special provisions.

- H. DVBEs and DVBE joint venture partners must be certified DVBEs as determined by the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814, on the date bids for the project are opened before credit may be allowed toward the DVBE goal. It is the Contractor's responsibility to verify that DVBEs are certified.
- I. Noncompliance by the Contractor with these requirements constitutes a breach of this contract and may result in termination of the contract or other appropriate remedy for a breach of this contract.

2-1.03 DVBE GOAL FOR THIS PROJECT

The Department has established the following goal for Disabled Veteran Business Enterprise (DVBE) participation for this project:

Disabled Veteran Business Enterprise (DVBE): 3 percent.

It is the bidder's responsibility to make a sufficient portion of the work available to subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DVBE subcontractors and suppliers, so as to assure meeting the goal for DVBE participation.

The Office of Small Business Certification and Resources, Department of General Services, may be contacted at (916) 322-5060 or visit their internet web site at <http://www.osmb.dgs.ca.gov/> for program information and certification status. The Department's Business Enterprise Program may also be contacted at (916) 227-9599 or the internet web site at <http://www.dot.ca.gov/hq/bep/>.

2-1.04 SUBMISSION OF DVBE INFORMATION

The required DVBE information shall be submitted on the "CALTRANS BIDDER - DVBE INFORMATION" form included in the Proposal. If this information is not submitted with the bid, the DVBE information forms shall be removed from the documents prior to submitting the bid.

It is the bidder's responsibility to make enough work available to DVBEs and to select those portions of the work or material needs consistent with the available DVBEs to meet the goal for DVBE participation or to provide information to establish that, prior to bidding, the bidder made adequate good faith efforts to do so.

If the DVBE information is not submitted with the bid, the apparent successful bidder (low bidder), the second low bidder and the third low bidder shall submit the DVBE information to the Department of Transportation, 1120 N Street, Room 0200, MS #26, Sacramento, California 95814 so the information is received by the Department no later than 4:00 p.m. on the fourth day, not including Saturdays, Sundays and legal holidays, following bid opening. DVBE information sent by U.S. Postal Service certified mail with return receipt and certificate of mailing and mailed on or before the third day, not including Saturdays, Sundays and legal holidays, following bid opening will be accepted even if it is received after the fourth day following bid opening. Failure to submit the required DVBE information by the time specified will be grounds for finding the bid or proposal nonresponsive. Other bidders need not submit DVBE information unless requested to do so by the Department.

The bidder's DVBE information shall establish that good faith efforts to meet the DVBE goal have been made. To establish good faith efforts, the bidder shall demonstrate that the goal will be met or that, prior to bidding, adequate good faith efforts to meet the goal were made.

Bidders are cautioned that even though their submittal indicates they will meet the stated DVBE goal, their submittal should also include their adequate good faith efforts information along with their DVBE goal information to protect their eligibility for award of the contract in the event the Department, in its review, finds that the goal has not been met.

The bidder's DVBE information shall include the names of DVBE firms that will participate, with a complete description of work or supplies to be provided by each, the dollar value of each DVBE transaction, and a written confirmation from the DVBE that it is participating in the contract. A copy of the DVBE's quote will serve as written confirmation that the DVBE is participating in the contract. When 100 percent of a contract item of work is not to be performed or furnished by a DVBE, a description of the exact portion of that work to be performed or furnished by that DVBE shall be included in the DVBE information, including the planned location of that work. The work that a DVBE prime contractor has committed to performing with its own forces as well as the work that it has committed to be performed by DVBE subcontractors, suppliers and trucking companies will count toward the goal.

If credit for trucking by a DVBE trucking broker is shown on the bidder's information as 100 percent of the revenue to be paid by the broker is to be paid to DVBE truckers, a "certified roster" of the broker's trucks to be used must be included. The "certified roster" must indicate that all the trucks are owned by certified DVBEs and must show the DVBE truck numbers, owner's name, Public Utilities Commission Cal-T numbers, and the DVBE certification numbers. The roster must indicate that all revenue paid by the broker will be paid to DVBEs listed on the "certified roster".

If credit for trucking by a trucking broker who is not a DVBE is shown in the bidder's information, a "certified roster" of the broker's trucks to be used must be included. The "certified roster" must indicate that at least 20 percent of the broker's trucks are owned by certified DVBEs and must show the DVBE truck numbers, owner's name, Public Utilities Commission Cal-T numbers, and the DVBE certification number. The roster must indicate that at least 20 percent of the revenue paid by the broker will be paid to DVBEs listed on the "certified roster".

A bidder shall be deemed to have made good faith efforts upon submittal, within time limits specified by the Department, of documentary evidence that all of the following actions were taken:

- A. Contact was made with the Office of Small Business Certification and Resources (OSBCR), Department of General Services or their web site at <http://www.osmb.dgs.ca.gov/> to identify Disabled Veteran Business Enterprises.
- B. Advertising was published in trade media and media focusing on Disabled Veteran Business Enterprises, unless time limits imposed by the Department do not permit that advertising.
- C. Invitations to bid were submitted to potential Disabled Veteran Business Enterprise contractors.
- D. Available Disabled Veteran Business Enterprises were considered.

2-1.05 SMALL BUSINESS PREFERENCE

Attention is directed to "Award and Execution of Contract" of these special provisions.

Attention is also directed to the Small Business Procurement and Contract Act, Government Code Section 14835, et seq and Title 2, California Code of Regulations, Section 1896, et seq.

Bidders who wish to be classified as a Small Business under the provisions of those laws and regulations, shall be certified as Small Business by the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814.

To request Small Business Preference, bidders shall fill out and sign the Request for Small Business Preference form in the Proposal and shall attach a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form. The bidder's signature on the Request for Small Business Preference certifies, under penalty of perjury, that the bidder is certified as Small Business at the time of bid opening and further certifies, under penalty of perjury, that under the following conditions, at least 50 percent of the subcontractors to be utilized on the project are either certified Small Business or have applied for Small Business certification by bid opening date and are subsequently granted Small Business certification.

The conditions requiring the aforementioned 50 percent level of subcontracting by Small Business subcontractors apply if:

- A. The lowest responsible bid for the project exceeds \$100,000; and
- B. The project work to be performed requires a Class A or a Class B contractor's license; and
- C. Two or more subcontractors will be used.

If the above conditions apply and Small Business Preference is granted in the award of the contract, the 50 percent Small Business subcontractor utilization level shall be maintained throughout the life of the contract.

2-1.06 CALIFORNIA COMPANY PREFERENCE

Attention is directed to "Award and Execution of Contract" of these special provisions.

In conformance with the requirements of Section 6107 of the Public Contract Code, a "California company" will be granted a reciprocal preference for bid comparison purposes as against a nonresident contractor from any state that gives or requires a preference to be given contractors from that state on its public entity construction contracts.

A "California company" means a sole proprietorship, partnership, joint venture, corporation, or other business entity that was a licensed California contractor on the date when bids for the public contract were opened and meets one of the following:

- A. Has its principal place of business in California.
- B. Has its principal place of business in a state in which there is no local contractor preference on construction contracts.
- C. Has its principal place of business in a state in which there is a local contractor construction preference and the contractor has paid not less than \$5000 in sales or use taxes to California for construction related activity for each of the five years immediately preceding the submission of the bid.

To carry out the "California company" reciprocal preference requirements of Section 6107 of the Public Contract Code, all bidders shall fill out and sign the California Company Preference form in the Proposal. The bidder's signature on the California Company Preference form certifies, under penalty of perjury, that the bidder is or is not a "California company" and if not, the amount of the preference applied by the state of the nonresident Contractor.

A nonresident Contractor shall disclose any and all bid preferences provided to the nonresident Contractor by the state or country in which the nonresident Contractor has its principal place of business.

Proposals without the California Company Preference form filled out and signed may be rejected.

SECTION 3. AWARD AND EXECUTION OF CONTRACT

The bidder's attention is directed to the provisions in Section 3, "Award and Execution of Contract," of the Standard Specifications and these special provisions for the requirements and conditions concerning award and execution of contract.

The award of the contract, if it be awarded, will be made within 60 days after the opening of the proposals. This period will be subject to extension for such further period as may be agreed upon in writing between the Department and the bidder concerned. The award, if made, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed and who has met the goal for DVBE participation or has demonstrated, to the satisfaction of the Department, adequate good faith efforts to do so. Meeting the goal for DVBE participation or demonstrating, to the satisfaction of the Department, adequate good faith efforts to do so is a condition for being eligible for award of contract.

A "Payee Data Record" form will be included in the contract documents to be executed by the successful bidder. The purpose of the form is to facilitate the collection of taxpayer identification data. The form shall be completed and returned to the Department by the successful bidder with the executed contract and contract bonds. For the purposes of the form, vendor shall be deemed to mean the successful bidder. The form is not to be completed for subcontractors or suppliers. Failure to complete and return the "Payee Data Record" form to the Department as provided herein will result in the retention of 20 percent of payments due the contractor and penalties of up to \$20,000. This retention of payments for failure to complete the "Payee Data Record" form is in addition to any other retention of payments due the Contractor.

Attention is also directed to "Small Business Preference" of these special provisions. Any bidder who is certified as a Small Business by the Department of General Services, Office of Small Business Certification and Resources will be allowed a preference in the award of this contract, if it be awarded, under the following conditions:

- A. The apparent low bidder is not certified as a Small Business, or has not filled out and signed the Request for Small Business Preference included with the bid documents and attached a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form; and

- B. The bidder filled out and signed the Request for Small Business Preference form included with the bid documents and attached a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form.

The small business preference will be a reduction in the bid submitted by the small business contractor, for bid comparison purposes, by an amount equal to 5 percent of the amount bid by the apparent low bidder, the amount not to exceed \$50,000. If this reduction results in the small business contractor becoming the low bidder, then the contract will be awarded to the small business contractor on the basis of the actual bid of the small business contractor notwithstanding the reduced bid price used for bid comparison purposes.

Attention is also directed to "California Company Preference" of these special provisions.

The amount of the California company reciprocal preference shall be equal to the amount of the preference applied by the state of the nonresident contractor with the lowest responsive bid, except where the "California company" is eligible for a California Small Business Preference, in which case the preference applied shall be the greater of the two, but not both.

If the bidder submitting the lowest responsive bid is not a "California company" and with the benefit of the reciprocal preference, a "California company's" responsive bid is equal to or less than the original lowest responsive bid, the "California company" will be awarded the contract at its submitted bid price except as provided below.

Small business bidders shall have precedence over nonsmall business bidders in that the application of the "California company" preference for which nonsmall business bidders may be eligible shall not result in the denial of the award to a small business bidder.

SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES

Attention is directed to the provisions in Section 8-1.03, "Beginning of Work," in Section 8-1.06, "Time of Completion," and in Section 8-1.07, "Liquidated Damages," of the Standard Specifications and these special provisions.

The Contractor shall begin work within 15 calendar days after the contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department of Transportation.

The work shall be diligently prosecuted to completion before the expiration of

900 WORKING DAYS

beginning on the fifteenth calendar day after approval of the contract.

The Contractor shall pay to the State of California the sum of \$ 250 per day, for each and every calendar day's delay in finishing the work in excess of the number of working days prescribed above.

SECTION 5. GENERAL

SECTION 5-1. MISCELLANEOUS

5-1.00 PLANS AND WORKING DRAWINGS

When the specifications require working drawings to be submitted to the Division of Structure Design, the drawings shall be submitted to: Division of Structure Design, Documents Unit, Mail Station 9, 1801 30th Street, Sacramento, CA 95816, Telephone (916) 227-8252.

5-1.003 LABORATORY

Section 1-1.25, "Laboratory," of the Standard Specifications is amended to read:

1-1.25 Laboratory.—The Division of Materials Engineering and Testing Services and the Division of Structural Foundations of the Department of Transportation, or established laboratories of the various Districts of the Department, or other laboratories authorized by the Department to test materials and work involved in the contract. When a reference is made in the specifications to the "Transportation Laboratory," the reference shall mean the Division of Materials Engineering and Testing Services and the Division of Structural Foundations, located at 5900 Folsom Boulevard, Sacramento, CA 95819, Telephone (916) 227-7000.

5-1.005 CONTRACT BONDS

Attention is directed to Section 3-1.02, "Contract Bonds," of the Standard Specifications and these special provisions. The payment bond shall be in a sum not less than the following:

1. One hundred percent of the total amount payable by the terms of the contract when the total amount payable does not equal or exceed five million dollars (\$5,000,000).
2. Fifty percent of the total amount payable by the terms of the contract when the total amount payable is not less than five million dollars (\$5,000,000) and does not exceed ten million dollars (\$10,000,000).
3. Twenty-five percent of the total amount payable by the terms of the contract when the total amount payable exceeds ten million dollars (\$10,000,000).

5-1.01 LABOR NONDISCRIMINATION

Attention is directed to the following Notice that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM (GOV. CODE, SECTION 12990)

Your attention is called to the "Nondiscrimination Clause", set forth in Section 7-1.01A(4), "Labor Nondiscrimination," of the Standard Specifications, which is applicable to all nonexempt state contracts and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth therein. The Specifications are applicable to all nonexempt state construction contracts and subcontracts of \$5000 or more.

5-1.02 LABOR CODE REQUIREMENTS

Section 7-1.01A(1), "Hours of Labor," of the Standard Specifications is amended to read:

7-1.01A(1) Hours of Labor.— Eight hours labor constitutes a legal day's work. The Contractor or any subcontractor under the Contractor shall forfeit, as a penalty to the State of California, \$25 for each worker employed in the execution of the contract by the respective Contractor or subcontractor for each calendar day during which that worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of the Labor Code, and in particular, Section 1810 to Section 1815, thereof, inclusive, except that work performed by employees of Contractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon compensation for all hours worked in excess of 8 hours per day at not less than one and one-half times the basic rate of pay, as provided in Section 1815 thereof.

Section 7-1.01A(2), "Prevailing Wage," of the Standard Specifications is amended to read:

7-1.01A(2) Prevailing Wage.— The Contractor and any subcontractor under the Contractor shall comply with Labor Code Sections 1774 and 1775. Pursuant to Section 1775, the Contractor and any subcontractor under the Contractor shall forfeit to the State or political subdivision on whose behalf the contract is made or awarded a penalty of not more than fifty dollars (\$50) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of Industrial Relations for the work or craft in which the worker is employed for any public work done under the contract by the Contractor or by any subcontractor under the Contractor in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. The amount of this forfeiture shall be determined by the Labor Commissioner and shall be based on consideration of the mistake, inadvertence, or neglect of the Contractor or subcontractor in failing to pay the correct rate of prevailing wages, or the previous record of the Contractor or subcontractor in meeting their respective prevailing wage obligations, or the willful failure by the Contractor or subcontractor to pay the correct rates of prevailing wages. A mistake, inadvertence, or neglect in failing to pay the correct rate of prevailing wages is not excusable if the Contractor or subcontractor had knowledge of the obligations under the Labor Code. In addition to the penalty and pursuant to Labor Code Section 1775, the difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor or subcontractor. If a worker employed by a subcontractor on a public works project is not paid the general prevailing per diem wages by the subcontractor, the prime contractor of the project is not liable for the penalties described above unless the prime contractor had knowledge of that failure of the subcontractor to pay the specified prevailing rate of wages to those workers or unless the prime contractor fails to comply with all of the following requirements:

1. The contract executed between the contractor and the subcontractor for the performance of work on the public works project shall include a copy of the provisions of Sections 1771, 1775, 1776, 1777.5, 1813, and 1815 of the Labor Code.
2. The contractor shall monitor the payment of the specified general prevailing rate of per diem wages by the subcontractor to the employees, by periodic review of the certified payroll records of the subcontractor.
3. Upon becoming aware of the subcontractor's failure to pay the specified prevailing rate of wages to the subcontractor's workers, the contractor shall diligently take corrective action to halt or rectify the failure, including, but not limited to, retaining sufficient funds due the subcontractor for work performed on the public works project.
4. Prior to making final payment to the subcontractor for work performed on the public works project, the contractor shall obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor has paid the specified general prevailing rate of per diem wages to the subcontractor's employees on the public works project and any amounts due pursuant to Section 1813 of the Labor Code.

Pursuant to Section 1775 of the Labor Code, the Division of Labor Standards Enforcement shall notify the Contractor on a public works project within 15 days of the receipt by the Division of Labor Standards Enforcement of a complaint of the failure of a subcontractor on that public works project to pay workers the general prevailing rate of per diem wages. If the Division of Labor Standards Enforcement determines that employees of a subcontractor were not paid the general prevailing rate of per diem wages and if the Department did not retain sufficient money under the contract to pay those employees the balance of wages owed under the general prevailing rate of per diem wages, the contractor shall withhold an amount of moneys due the subcontractor sufficient to pay those employees the general prevailing rate of per diem wages if requested by the Division of Labor Standards Enforcement. The Contractor shall pay any money retained from and owed to a subcontractor upon receipt of notification by the Division of Labor Standards Enforcement that the wage complaint has been resolved. If notice of the resolution of the wage complaint has not been received by the Contractor within 180 days of the filing of a valid notice of completion or acceptance of the public works project, whichever occurs later, the Contractor shall pay all moneys retained from the subcontractor to the Department. These moneys shall be retained by the Department pending the final decision of an enforcement action.

Pursuant to the provisions of Section 1773 of the Labor Code, the Department has obtained the general prevailing rate of wages (which rate includes employer payments for health and welfare, pension, vacation, travel time, and subsistence pay as provided for in Section 1773.8 of the Labor Code, apprenticeship or other training programs authorized by Section 3093 of the Labor Code, and similar purposes) applicable to the work to be done, for straight time, overtime, Saturday, Sunday and holiday work. The holiday wage rate listed shall be applicable to all holidays recognized in the collective bargaining agreement of the particular craft, classification or type of workmen concerned. The general prevailing wage rates and any applicable changes to these wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated. For work situated in District 9, the wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for District 6, located at Fresno. General prevailing wage rates are also available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>.

The wage rates determined by the Director of Industrial Relations for the project refer to expiration dates. Prevailing wage determinations with a single asterisk after the expiration date are in effect on the date of advertisement for bids and are good for the life of the contract. Prevailing wage determinations with double asterisks after the expiration date indicate that the wage rate to be paid for work performed after this date has been determined. If work is to extend past this date, the new rate shall be paid and incorporated in the contract. The Contractor shall contact the Department of Industrial Relations as indicated in the wage rate determinations to obtain predetermined wage changes.

Pursuant to Section 1773.2 of the Labor Code, general prevailing wage rates shall be posted by the Contractor at a prominent place at the site of the work.

Changes in general prevailing wage determinations which conform to Labor Code Section 1773.6 and Title 8 California Code of Regulations Section 16204 shall apply to the project when issued by the Director of Industrial Relations at least 10 days prior to the date of the Notice to Contractors for the project.

The State will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth in the contract. The possibility of wage increases is one of the elements to be considered by the Contractor in determining the bid, and will not under any circumstances be considered as the basis of a claim against the State on the contract.

7-1.01A(2)(a) Travel and Subsistence Payments.— Attention is directed to the requirements of Section 1773.8 of the Labor Code. The Contractor shall make travel and subsistence payments to each workman, needed to execute the work, in accordance with the requirements in Labor Code Section 1773.8.

The first and second paragraphs of Section 7-1.01A(3), "Payroll Records," of the Standard Specifications are amended to read:

7-1.01A(3) Payroll Records.— Attention is directed to the provisions of Labor Code Section 1776, a portion of which is quoted below. Regulations implementing Labor Code Section 1776 are located in Sections 16016 through 16019 and Sections 16207.10 through 16207.19 of Title 8, California Code of Regulations.

"1776. (a) Each contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

(1) The information contained in the payroll record is true and correct.

(2) The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.

"(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the contractor on the following basis:

(1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.

(2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.

(3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding the contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the contractor.

"(c) The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.

"(d) A contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

"(e) Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in a manner so as to prevent disclosure of an individual's name, address, and social security number. The name and address of the contractor awarded the contract or the subcontractor performing the contract shall not be marked or obliterated.

"(f) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

"(g) The contractor or subcontractor shall have 10 days in which to comply subsequent to receipt of a written notice requesting the records enumerated in subdivision (a). In the event that the contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section."

The penalties specified in subdivision (g) of Labor Code Section 1776 for noncompliance with the provisions of Section 1776 may be deducted from any moneys due or which may become due to the Contractor.

5-1.023 INDEMNIFICATION AND INSURANCE

Section 7-1.12, "Responsibility for Damage," of the Standard Specifications is deleted. All references to Section 7-1.12 in the Contract documents shall be deemed to mean Sections 7-1.121, "Indemnification," and 7-1.122, "Insurance," as added below.

The Standard Specifications is amended by adding the following Section 7-1.121, "Indemnification," and Section 7-1.122, "Insurance," before Section 7-1.125, "Legal Action Against the Department":

7-1.121 Indemnification.—With the exception that this section shall in no event be construed to require indemnification by the Contractor to a greater extent than permitted by law, the Contractor shall defend, indemnify and save harmless the State, including its officers, directors, agents (excluding agents who are design professionals), and employees, and each of them (Indemnitees), from any and all claims, demands, causes of action, damages, costs, expenses, actual attorneys' fees, losses or liabilities, in law or in equity, of every kind and nature whatsoever (Claims), arising out of or in connection with the Contractor's performance of this contract for:

- A. Bodily injury including, but not limited to, bodily injury, sickness or disease, emotional injury or death to persons, including, but not limited to, the public, any employees or agents of the Contractor, State, Department, or any other contractor and;
- B. Damage to property of anyone including loss of use thereof;

caused or alleged to be caused in whole or in part by any negligent or otherwise legally actionable act or omission of the Contractor or anyone directly or indirectly employed by the Contractor or anyone for whose acts the Contractor may be liable.

Except as otherwise provided by law, the indemnification provisions above shall apply regardless of the existence or degree of fault of Indemnitees. The Contractor, however, shall not be obligated to indemnify Indemnitees for Claims arising from conduct delineated in Civil Code section 2782. Further, the Contractor's indemnity obligation shall not extend to Claims to the extent they arise from any defective or substandard condition of the roadway which existed at or prior to the time the Contractor commenced work, unless this condition has been changed by the work or the scope of the work requires the Contractor to maintain existing Roadway facilities and the claim arises from the Contractor's failure to maintain. The Contractor's indemnity obligation shall extend to Claims arising after the work is completed and accepted only if these Claims are directly related to alleged acts or omissions of the Contractor which occurred during the course of the work. No inspection by the Department, its employees or agents shall be deemed a waiver by the Department of full compliance with the requirements of this section.

The Contractor's obligation to defend and indemnify shall not be excused because of the Contractor's inability to evaluate liability or because the Contractor evaluates liability and determines that the Contractor is not liable to the claimant. The Contractor will respond within 30 days to the tender of any claim for defense and indemnity by the State, unless this time has been extended by the State. If the Contractor fails to accept or reject a tender of defense and indemnity within 30 days, in addition to any other remedy authorized by law, so much of the money due the Contractor under and by virtue of the contract as shall reasonably be considered necessary by the Department, may be retained by the State until disposition has been made of the claim or suit for damages, or until the Contractor accepts or rejects the tender of defense, whichever occurs first.

With respect to third party claims against the Contractor, the Contractor waives any and all rights of any type to express or implied indemnity against the State, its directors, officers, employees, or agents (excluding agents who are design professionals).

7-1.122 Insurance.—Insurance shall conform to the following requirements:

7-1.122A Casualty Insurance.—The Contractor shall, at the Contractor's expense, procure and maintain insurance on all of its operations with companies acceptable to the Department as follows. All insurance shall be kept in full force and effect from the beginning of the work through final acceptance by the State. In addition, the Contractor shall maintain completed operations coverage with a carrier acceptable to the Department through the expiration of the patent deficiency in construction statute of repose set forth in Section 337.1 of the Code of Civil Procedure.

7-1.122A(1) Workers' Compensation and Employer's Liability Insurance.—Workers' Compensation insurance shall be provided as specified in Section 7-1.01A(6), "Workers' Compensation." Employer's Liability Insurance shall be provided in amounts not less than:

- (a) \$1 000 000 for each accident for bodily injury by accident.
- (b) \$1 000 000 policy limit for bodily injury by disease.
- (c) \$1 000 000 for each employee for bodily injury by disease.

If there is an exposure of injury to the Contractors' employees under the U.S. Longshoremen's and Harbor Workers' Compensation Act, the Jones Act or under laws, regulations or statutes applicable to maritime employees, coverage shall be included for such injuries or claims.

7-1.122A(2) Liability Insurance.—The Contractor shall carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of the Contractor providing insurance for bodily injury liability, and property damage liability for the limits of liability indicated below and including coverage for:

- (a) premises, operations and mobile equipment
- (b) products and completed operations
- (c) broad form property damage (including completed operations)
- (d) explosion, collapse and underground hazards
- (e) personal injury
- (f) contractual liability

7-1.122A(3) Liability Limits/Additional Insureds.—The limits of liability shall be at least:

- (a) \$1 000 000 for each occurrence (combined single limit for bodily injury and property damage).
- (b) \$2 000 000 aggregate for products-completed operations.
- (c) \$2 000 000 general aggregate. This general aggregate limit shall apply separately to the Contractor's work under this Agreement.
- (d) \$5 000 000 umbrella or excess liability. For projects over \$25 000 000 only, an additional \$10 000 000 umbrella or excess liability (for a total of \$15 000 000). Umbrella or excess policy shall include products liability completed operations coverage and may be subject to \$5 000 000 or \$15 000 000 aggregate limits. Further, the umbrella or excess policy shall contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

The State and the Department, including their officers, directors, agents (excluding agents who are design professionals), and State employees, shall be named as additional insureds under the General Liability and Umbrella Liability Policies with respect to liability arising out of or connected with work or operations performed by or on behalf of the Contractor under this contract. Coverage for such additional insureds shall not extend to liability:

- (1) arising from any defective or substandard condition of the Roadway which existed at or prior to the time the Contractor commenced work, unless such condition has been changed by the work or the scope of the work requires the Contractor to maintain existing Roadway facilities and the claim arises from the Contractor's failure to maintain; or
- (2) for claims occurring after the work is completed and accepted unless these claims are directly related to alleged acts or omissions of the Contractor which occurred during the course of the work; or
- (3) to the extent prohibited by Section 11580.04 of the Insurance Code.

The policy shall stipulate that the insurance afforded the additional insureds shall apply as primary insurance. Any other insurance or self insurance maintained by the Department or State will be excess only and shall not be called upon to contribute with this insurance. Such additional insured coverage shall be provided by a policy provision or by an endorsement providing coverage at least as broad as Additional Insured (Form B) endorsement form CG 1010, as published by the Insurance Services Office (ISO).

7-1.122B Automobile Liability Insurance.—The Contractor shall carry automobile liability insurance, including coverage for all owned, hired and non-owned automobiles. The primary limits of liability shall be not less than \$1 000 000 combined single limit each accident for bodily injury and property damage. The umbrella or excess liability coverage required under Section 7-1.122A(3), "Liability Limits/Additional Insureds," shall also apply to automobile liability.

7-1.122C Policy Forms, Endorsements and Certificates.—The Contractor's General Liability Insurance shall be provided under Commercial General Liability policy form no. CG0001 as published by the Insurance Services Office (ISO) or under a policy form at least as broad as policy form no. CG0001.

Evidence of insurance in a form acceptable to the Department, including the required "additional insured" endorsements, shall be furnished by the Contractor to the Department at or prior to the pre-construction conference. The evidence of insurance shall provide that there will be no cancellation, lapse, or reduction of coverage without thirty (30) days' prior written notice to the Department. Certificates of Insurance, as evidence of required insurance, for the General Liability, Auto Liability and Umbrella-Excess Liability policies shall set forth deductible amounts applicable to each policy and all exclusions which are added by endorsement to each policy. The Department may expressly allow deductible clauses, which it does not consider excessive, overly broad, or harmful to the interests of the State. Standard ISO form CG 0001 or similar exclusions will be allowed provided they are not inconsistent with the requirements of this section. Allowance of any additional exclusions is at the discretion of the Department. Regardless of the allowance of exclusions or deductions by the Department, the Contractor shall be responsible for any deductible amount and shall warrant that the coverage provided to the Department is consistent with the requirements of this section.

7-1.122D Enforcement.—The Department may take any steps as are necessary to assure Contractor's compliance with its obligations. Should any insurance policy lapse or be canceled during the contract period the Contractor shall, within thirty (30) days prior to the effective expiration or cancellation date, furnish the Department with evidence of renewal or replacement of the policy. Failure to continuously maintain insurance coverage as herein provided is a material breach of contract. In the event the Contractor fails to maintain any insurance coverage required, the Department may, but is not required to, maintain this coverage and charge the expense to the Contractor or terminate this Agreement. The required insurance shall be subject to the approval of Department, but any acceptance of insurance certificates by the Department shall in no way limit or relieve the Contractor of the Contractor's duties and responsibilities under the Contract to indemnify, defend and hold harmless the State, its officers, agents, and employees. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve the Contractor for liability in excess of such coverage, nor shall it preclude the State from taking other actions as is available to it under any other provision of the contract or law. Failure of the Department to enforce in a timely manner any of the provisions of this section shall not act as a waiver to enforcement of any of these provisions at a later date.

7-1.122E Self-Insurance.—Self-insurance programs and self-insured retentions in insurance policies are subject to separate annual review and approval by the State of evidence of the Contractor's financial capacity to respond. Additionally, self-insurance programs or retentions must provide the State with at least the same protection from liability and defense of suits as would be afforded by first-dollar insurance.

7-1.122F Miscellaneous.—Nothing contained in the Contract is intended to make the public or any member thereof a third party beneficiary of the Insurance or Indemnity provisions of these Standard Specifications, nor is any term, condition or other provision of the Contract intended to establish a standard of care owed to the public or any member thereof.

5-1.025 ARBITRATION

The last paragraph in Section 9-1.10, "Arbitration," of the Standard Specifications, is amended to read:

Arbitration shall be initiated by a Complaint in Arbitration made in compliance with the requirements of those regulations. A Complaint in Arbitration by the Contractor shall be made not later than 90 days after the date of service in person or by mail on the Contractor of the final written decision by the Department on the claim.

5-1.03 PAYMENT OF WITHHELD FUNDS

Section 9-1.065, "Payment of Withheld Funds," of the Standard Specifications, is amended by adding the following after the third paragraph:

Alternatively, and subject to the approval of the Department, the payment of retentions earned may be deposited directly with a person licensed under Division 6 (commencing with Section 17000) of the Financial Code as the escrow agent. Upon written request of an escrow agent that has not been approved by the Department under subdivision (c) of Section 10263 of the Public Contract Code, the Department will provide written notice to that escrow agent within 10 business days of receipt of the request indicating the reason or reasons for not approving that escrow agent. The payments will be deposited in a trust account with a Federally chartered bank or savings association within 24 hours of receipt by the escrow agent. The Contractor shall not place any retentions with the escrow agent in excess of the coverage provided to that escrow agent pursuant to subdivision (b) of Section 17314 of the Financial Code. In all respects not inconsistent with subdivision (c) of Section 10263 of the Public Contract Code, the remaining provisions of Section 10263 of the Public Contract Code shall apply to escrow agents acting pursuant to subdivision (c) of Section 10263 of the Public Contract Code.

5-1.04 INTEREST ON PAYMENTS

Interest shall be payable on progress payments, payments after acceptance, final payments, extra work payments and claim payments as follows:

1. Unpaid progress payments, payment after acceptance and final payments shall begin to accrue interest 30 days after the Engineer prepares the payment estimate.
2. Unpaid extra work bills shall begin to accrue interest 30 days after preparation of the first pay estimate following the receipt of a properly submitted and undisputed extra work bill. To be properly submitted, the bill must be submitted within 7 days of the performance of the extra work and in accordance with the requirements of Section 9-1.03C, "Records," and Section 9-1.06, "Partial Payments," of the Standard Specifications. An undisputed extra work bill not submitted within 7 days of performance of the extra work will begin to accrue interest 30 days after the preparation of the second pay estimate following submittal of the bill.
3. The rate of interest payable for unpaid progress payments, payments after acceptance, final payments and extra work payments shall be 10 percent per annum.
4. The rate of interest payable on a claim, protest or dispute ultimately allowed under this contract shall be 6 percent per annum. Interest shall begin to accrue 61 days after the Contractor submits to the Engineer information in sufficient detail to enable the Engineer to ascertain the basis and amount of said claim, protest or dispute.

The rate of interest payable on any award in arbitration shall be 6 percent per annum if allowed under the provisions of Civil Code Section 3289.

5-1.05 PUBLIC SAFETY

The Contractor shall provide for the safety of traffic and the public in conformance with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications and these special provisions.

The Contractor shall install temporary railing (Type K) between a lane open to public traffic and an excavation, obstacle, or storage area when the following conditions exist:

- (1) Excavations.—The near edge of the excavation is 3.6 m or less from the edge of the lane, except:
 - (a) Excavations covered with sheet steel or concrete covers of adequate thickness to prevent accidental entry by traffic or the public.
 - (b) Excavations less than 0.3-m deep.
 - (c) Trenches less than 0.3-m wide for irrigation pipe or electrical conduit, or excavations less than 0.3-m in diameter.
 - (d) Excavations parallel to the lane for the purpose of pavement widening or reconstruction.
 - (e) Excavations in side slopes, where the slope is steeper than 1:4 (vertical:horizontal).
 - (f) Excavations protected by existing barrier or railing.
- (2) Temporarily Unprotected Permanent Obstacles.—The work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and the Contractor elects to install the obstacle prior to installing the protective system; or the Contractor, for the Contractor's convenience and with permission of the Engineer, removes a portion of an existing protective railing at an obstacle and does not replace such railing complete in place during the same day.
- (3) Storage Areas.—Material or equipment is stored within 3.6 m of the lane and the storage is not otherwise prohibited by the provisions of the Standard Specifications and these special provisions.

The approach end of temporary railing (Type K), installed in conformance with the provisions in this section "Public Safety" and in Section 7-1.09, "Public Safety," of the Standard Specifications, shall be offset a minimum of 4.6 m from the edge of the traffic lane open to public traffic. The temporary railing shall be installed on a skew toward the edge of the traffic lane of not more than 0.3-m transversely to 3 m longitudinally with respect to the edge of the traffic lane. If the 4.6-m minimum offset cannot be achieved, the temporary railing shall be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules shall be installed at the approach end of the temporary railing.

Temporary railing (Type K) shall conform to the provisions in Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications. Temporary railing (Type K), conforming to the details shown on 1995 Standard Plan T3 or 1992 Standard Plan T3, may be used. Temporary railing (Type K) fabricated prior to January 1, 1993, and conforming to 1988 Standard Plan B11-30 may be used, provided the fabrication date is printed on the required Certificate of Compliance.

The fourteenth paragraph of Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications is amended to read:

Each rail unit placed within 3 m of a traffic lane shall have a reflector installed on top of the rail as directed by the Engineer. A Type P marker panel shall also be installed at each end of railing installed adjacent to a two-lane, two-way highway and at the end facing traffic of railing installed adjacent to a one-way roadbed. If the railing is placed on a skew, the marker shall be installed at the end of the skew nearest the traveled way. Type P marker panels shall conform to the provisions in Section 82, "Markers and Delineators," except that the Contractor shall furnish the marker panels.

Reflectors on temporary railing (Type K) shall conform to the provisions in "Approved Traffic Products" of these special provisions.

Temporary crash cushion modules shall conform to the provisions in "Temporary Crash Cushion Module" of these special provisions.

Except for installing, maintaining and removing traffic control devices, whenever work is performed or equipment is operated in the following work areas the Contractor shall close the adjacent traffic lane unless otherwise provided in the Standard Specifications and these special provisions:

Approach speed of public traffic (Posted Limit) (Kilometers Per Hour)	Work Areas
Over 72 (45 Miles Per Hour)	Within 1.8 m of a traffic lane but not on a traffic lane
56 to 72 (35 to 45 Miles Per Hour)	Within 0.9-m of a traffic lane but not on a traffic lane

The lane closure provisions of this section shall not apply if the work area is protected by permanent or temporary railing or barrier.

When traffic cones or delineators are used to delineate a temporary edge of traffic lane, the line of cones or delineators shall be considered to be the edge of traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 3 m without written approval from the Engineer.

When work is not in progress on a trench or other excavation that required closure of an adjacent lane, the traffic cones or portable delineators used for the lane closure shall be placed off of and adjacent to the edge of the traveled way. The spacing of the cones or delineators shall be not more than the spacing used for the lane closure.

Suspended loads or equipment shall not be moved nor positioned over public traffic or pedestrians.

Full compensation for conforming to the provisions in this section "Public Safety," including furnishing and installing temporary railing (Type K) and temporary crash cushion modules, shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

5-1.06 SURFACE MINING AND RECLAMATION ACT

Attention is directed to the Surface Mining and Reclamation Act of 1975, commencing in Public Resources Code, Mining and Geology, Section 2710, which establishes regulations pertinent to surface mining operations.

Material from mining operations furnished for this project shall only come from permitted sites in compliance with the Surface Mining and Reclamation Act of 1975.

The requirements of this section shall apply to all materials furnished for the project, except for acquisition of materials in conformance with Section 4-1.05, "Use of Materials Found on the Work," of the Standard Specifications.

5-1.07 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES

When the presence of asbestos or hazardous substances are not shown on the plans or indicated in the specifications and the Contractor encounters materials which the Contractor reasonably believes to be asbestos or a hazardous substance as defined in Section 25914.1 of the Health and Safety Code, and the asbestos or hazardous substance has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed to be safe, and shall immediately cease work in the affected area and report the condition to the Engineer in writing.

In accordance with Section 25914.1 of the Health and Safety Code, all such removal of asbestos or hazardous substances including any exploratory work to identify and determine the extent of the asbestos or hazardous substance will be performed by separate contract.

If delay of work in the area delays the current controlling operation, the delay will be considered a right of way delay and the Contractor will be compensated for the delay as provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

5-1.08 YEAR 2000 COMPLIANCE

This contract is subject to Year 2000 Compliance for automated devices in the State of California. Year 2000 compliance is defined as follows:

Year 2000 compliance for automated devices in the State of California is achieved when embedded functions have or create no logical or mathematical inconsistencies when dealing with dates prior to and beyond 1999. The year 2000 is recognized and processed as a leap year. The product must also operate accurately in the manner in which it was intended for date operation without requiring manual intervention.

The Contractor shall provide the Engineer a Certificate of Compliance from the manufacturer in accordance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for all automated devices furnished for the project.

5-1.09 SUBCONTRACTOR AND DVBE RECORDS

The Contractor shall maintain records of all subcontracts entered into with certified DVBE subcontractors and records of materials purchased from certified DVBE suppliers. The records shall show the name and business address of each DVBE subcontractor or vendor and the total dollar amount actually paid each DVBE subcontractor or vendor.

Upon completion of the contract, a summary of these records shall be prepared on Form CEM-2402 (S) and certified correct by the Contractor or the Contractor's authorized representative, and shall be furnished to the Engineer.

5-1.095 PERFORMANCE OF DVBE SUBCONTRACTORS AND SUPPLIERS

The DVBEs listed by the Contractor in response to the provisions in Section 2-1.04, "Submission of DVBE Information," and Section 3, "Award and Execution of Contract," of these special provisions, which are determined by the Department to be certified DVBEs, shall perform the work and supply the materials for which they are listed, unless the Contractor has received prior written authorization to perform the work with other forces or to obtain the materials from other sources.

Authorization to utilize other forces or sources of materials may be requested for the following reasons:

- A. The listed DVBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract, when the written contract, based upon the general terms, conditions, plans and specifications for the project, or on the terms of the subcontractor's or supplier's written bid, is presented by the Contractor.
- B. The listed DVBE becomes bankrupt or insolvent.
- C. The listed DVBE fails or refuses to perform the subcontract or furnish the listed materials.
- D. The Contractor stipulated that a bond was a condition of executing a subcontract and the listed DVBE subcontractor fails or refuses to meet the bond requirements of the Contractor.
- E. The work performed by the listed subcontractor is substantially unsatisfactory and is not in substantial conformance with the plans and specifications, or the subcontractor is substantially delaying or disrupting the progress of the work.
- F. The listed DVBE subcontractor is not licensed pursuant to the Contractor's License Law.
- G. It would be in the best interest of the State.

The Contractor shall not be entitled to payment for the work or material unless it is performed or supplied by the listed DVBE or by other forces (including those of the Contractor) pursuant to prior written authorization of the Engineer.

5-1.097 SUBCONTRACTING

Attention is directed to the provisions in Section 8-1.01, "Subcontracting," of the Standard Specifications, Section 2, "Proposal Requirements and Conditions," Section 2-1.04, "Submission of DVBE Information," and Section 3, "Award and Execution of Contract," of these special provisions and these special provisions.

Section 8-1.01 of the Standard Specifications is amended by adding the following before the sixth paragraph:

Pursuant to the provisions of Section 6109 of the Public Contract Code, the Contractor shall not perform work on a public works project with a subcontractor who is ineligible to perform work on the public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code.

Pursuant to the provisions in Section 1777.1 of the Labor Code, the Labor Commissioner publishes and distributes a list of contractors ineligible to perform work as a subcontractor on a public works project. This list of debarred contractors is available from the Department of Industrial Relations web site at:

The DVBE information furnished under Section 2-1.04, "Submission of DVBE Information," of these special provisions is in addition to the subcontractor information required to be furnished in Section 8-1.01, "Subcontracting," and Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications.

Section 10115 of the Public Contract Code requires the Department to implement provisions to establish a goal for Disabled Veteran Business Enterprise (DVBE) participation in highway contracts that are State funded. As a part of this requirement:

1. No substitution of a DVBE subcontractor shall be made at any time without the written consent of the Department, and
2. If a DVBE subcontractor is unable to perform successfully and is to be replaced, the Contractor shall make good faith efforts to replace the original DVBE subcontractor with another DVBE subcontractor.

The provisions in Section 2-1.02, "Disabled Veteran Business Enterprise (DVBE)," of these special provisions that DVBEs shall be certified on the date bids are opened does not apply to DVBE substitutions after award of the contract.

5-1.098 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS

Attention is directed to the provisions in Sections 10262 and 10262.5 of the Public Contract Code and Section 7108.5 of the Business and Professions Code concerning prompt payment to subcontractors.

5-1.10 AREAS FOR CONTRACTOR'S USE

Attention is directed to the requirements specified in Section 7-1.19, "Rights in Land and Improvements," of the Standard Specifications and these special provisions.

The highway right of way shall be used only for purposes that are necessary to perform the required work. The Contractor shall not occupy the right of way, or allow others to occupy the right of way, for purposes which are not necessary to perform the required work.

There are no State-owned parcels adjacent to the right of way for the exclusive use of the Contractor within the contract limits. The Contractor shall secure, at the Contractor's own expense, any area required for plant sites, storage of equipment or materials, or for other purposes.

No area is available within the contract limits for the exclusive use of the Contractor. However, temporary storage of equipment and materials on State property may be arranged with the Engineer, subject to the prior demands of State maintenance forces and to all other contract requirements. Use of the Contractor's work areas and other State-owned property shall be at the Contractor's own risk, and the State shall not be held liable for any damage to or loss of materials or equipment located within such areas.

Residence trailers will not be allowed within the highway right of way, except that one trailer will be allowed for yard security purposes.

The Contractor shall remove all equipment, materials, and rubbish from the work areas and other State-owned property which the Contractor occupies; and shall leave the areas in a presentable condition, in accordance with the provisions in Section 4-1.02, "Final Cleaning Up," of the Standard Specifications.

The Contractor shall secure, at the Contractor's own expense, any area required for storage of equipment or materials; or for other purposes, if sufficient area is not available to the Contractor within the contract limits

5-1.11 PAYMENTS

Attention is directed to Sections 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications and these special provisions.

For the purpose of making partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications, the amount set forth for the contract items of work hereinafter listed shall be deemed to be the maximum value of the contract item of work which will be recognized for progress payment purposes:

Roadside Clearing	\$ 20,000
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After acceptance of the contract pursuant to Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, the amount, if any, payable for a contract item of work in excess of the maximum value for progress payment purposes hereinabove listed for the item, will be included for payment in the first estimate made after acceptance of the contract.

In determining the partial payments to be made to the Contractor, only the following listed materials will be considered for inclusion in the payment as materials furnished but not incorporated in the work:

- Field units and enclosure cabinets
- Plastic pipe (supply line)
- Sprinklers
- Valves and valve boxes
- Armor clad wire

5-1.12 SOUND CONTROL REQUIREMENTS

Sound control shall conform to the provisions in Section 7-1.01I, "Sound Control Requirements," of the Standard Specifications and these special provisions.

The noise level from the Contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 dbA at a distance of 15 m. This requirement in no way relieves the Contractor from responsibility for complying with local ordinances regulating noise level.

The noise level requirement shall apply to the equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

5-1.13 ENVIRONMENTALLY SENSITIVE AREAS

Environmentally sensitive areas have been identified at specific locations as shown on the plans. These areas shall be protected from disturbance of any kind, including but not limited to, construction work, equipment or material storage, excavations, manual digging, salvaging, pilfering or collecting.

Where new plants are shown on the plans to be placed within the designated environmentally sensitive areas, minimal mowing as required for installation of irrigation facilities and other access as required to place or tend the new plants will be permitted. Removal of trash and debris as specified under "Roadside Clearing" of these special provisions will also be permitted within environmentally sensitive areas.

These areas shall be considered restricted areas and no entry shall be allowed other than as expressly permitted above. This includes pedestrian traffic, equipment movement, material storage or any other action which could disturb the native resources. All employees or other personnel on the project site shall be informed about these areas and shall be directed not to enter or disturb these environmentally sensitive areas in any manner.

Full compensation for conforming to the provisions of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

SECTION 6. (BLANK)

SECTION 7. (BLANK)

SECTION 8. MATERIALS

SECTION 8-1. MISCELLANEOUS

8-1.01 SUBSTITUTION OF NON-METRIC MATERIALS AND PRODUCTS

Only materials and products conforming to the requirements of the specifications shall be incorporated in the work. When metric materials and products are not available, and when approved by the Engineer, and at no cost to the State, materials and products in the inch-pound (imperial) system which are of equal quality and of the required properties and characteristics for the purpose intended, may be substituted for the equivalent metric materials and products, subject to the following provisions:

Materials and products shown on the plans or in the special provisions as being equivalent may be substituted for the metric materials and products specified or detailed on the plans.

Before other non-metric materials and products will be considered for use the Contractor shall furnish, at the Contractor's expense, evidence satisfactory to the Engineer that the materials and products proposed for use are equal to or better than the materials and products specified or detailed on the plans. The burden of proof as to the quality and

suitability of substitutions shall be upon the Contractor and the Contractor shall furnish necessary information as required by the Engineer. The Engineer will be the sole judge as to the quality and suitability of the substituted materials and products and the Engineer's decision will be final.

When the Contractor elects to substitute non-metric materials and products, including materials and products shown on the plans or in the special provisions as being equivalent, the list of sources of material as specified in Section 6-1.01, "Source of Supply and Quality of Materials," of the Standard Specification shall include a list of substitutions to be made and contract items involved. In addition, for a change in design or details the Contractor shall submit plans and working drawings in conformance with Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications.

Unless otherwise specified, the following substitutions of materials and products will be allowed:

SUBSTITUTION TABLE FOR SIZES OF HIGH STRENGTH STEEL FASTENERS

ASTM Designation: A 325M

METRIC SIZE SHOWN ON THE PLANS mm x thread pitch	IMPERIAL SIZE TO BE SUBSTITUTED inch
M16 x 2	5/8
M20 x 2.5	3/4
M22 x 2.5	7/8
M24 x 3	1
M27 x 3	1-1/8
M30 x 3.5	1-1/4
M36 x 4	1-1/2

SUBSTITUTION TABLE FOR PLAIN WIRE REINFORCEMENT, ASTM Designation: A 82

METRIC SIZE SHOWN ON THE PLANS mm ²	US CUSTOMARY UNITS SIZE TO BE SUBSTITUTED inch ² x 100
MW9	W1.4
MW10	W1.6
MW13	W2.0
MW15	W2.3
MW19	W2.9
MW20	W3.1
MW22	W3.5
MW25	W3.9, except W3.5 in piles only
MW26	W4.0
MW30	W4.7
MW32	W5.0
MW35	W5.4
MW40	W6.2
MW45	W6.5
MW50	W7.8
MW55	W8.5, except W8.0 in piles only
MW60	W9.3
MW70	W10.9, except W11.0 in piles only
MW80	W12.4
MW90	W14.0
MW100	W15.5

SUBSTITUTION TABLE FOR BAR REINFORCEMENT

METRIC BAR DESIGNATION NUMBER SHOWN ON THE PLANS	EQUIVALENT IMPERIAL BAR DESIGNATION NUMBER TO BE SUBSTITUTED
13	4
16	5
19	6
22	7
25	8
29	9
32	10
36	11
43	14
57	18

No adjustment will be required in spacing or total number of reinforcing bars due to a difference in minimum yield strength between metric and non-metric bars.

The sizes in the following tables of materials and products are exact conversions of metric sizes of materials and products and are listed as acceptable equivalents:

CONVERSION TABLE FOR SIZES OF:

- (1) STEEL FASTENERS FOR GENERAL APPLICATIONS, ASTM Designation: A 307 or AASHTO Designation: M 314, Grade 36 or 55, and
- (2) HIGH STRENGTH STEEL FASTENERS, ASTM Designation: A 325 or A 449

METRIC SIZE SHOWN ON THE PLANS mm	EQUIVALENT IMPERIAL SIZE inch
6, or 6.35	1/4
8 or 7.94	5/16
10, or 9.52	3/8
11, or 11.11	7/16
13 or 12.70	1/2
14, or 14.29	9/16
16, or 15.88	5/8
19, or 19.05	3/4
22, or 22.22	7/8
24, 25, or 25.40	1
29, or 28.58	1-1/8
32, or 31.75	1-1/4
35, or 34.93	1-3/8
38 or 38.10	1-1/2
44, or 44.45	1-3/4
51, or 50.80	2
57, or 57.15	2-1/4
64, or 63.50	2-1/2
70 or 69.85	2-3/4
76, or 76.20	3
83, or 82.55	3-1/4
89 or 88.90	3-1/2
95, or 95.25	3-3/4
102, or 101.60	4

CONVERSION TABLE FOR NOMINAL THICKNESS OF SHEET METAL

UNCOATED HOT AND COLD ROLLED SHEETS		HOT-DIPPED ZINC COATED SHEETS (GALVANIZED)	
METRIC THICKNESS SHOWN ON THE PLANS	EQUIVALENT US STANDARD GAGE	METRIC THICKNESS SHOWN ON THE PLANS	EQUIVALENT GALVANIZED SHEET GAGE
mm	inch	mm	inch
7.94	0.3125	4.270	0.1681
6.07	0.2391	3.891	0.1532
5.69	0.2242	3.510	0.1382
5.31	0.2092	3.132	0.1233
4.94	0.1943	2.753	0.1084
4.55	0.1793	2.372	0.0934
4.18	0.1644	1.994	0.0785
3.80	0.1495	1.803	0.0710
3.42	0.1345	1.613	0.0635
3.04	0.1196	1.461	0.0575
2.66	0.1046	1.311	0.0516
2.28	0.0897	1.158	0.0456
1.90	0.0747	1.006 or 1.016	0.0396
1.71	0.0673	0.930	0.0366
1.52	0.0598	0.853	0.0336
1.37	0.0538	0.777	0.0306
1.21	0.0478	0.701	0.0276
1.06	0.0418	0.627	0.0247
0.91	0.0359	0.551	0.0217
0.84	0.0329	0.513	0.0202
0.76	0.0299	0.475	0.0187
0.68	0.0269	-----	-----
0.61	0.0239	-----	-----
0.53	0.0209	-----	-----
0.45	0.0179	-----	-----
0.42	0.0164	-----	-----
0.38	0.0149	-----	-----

CONVERSION TABLE FOR WIRE

METRIC THICKNESS SHOWN ON THE PLANS mm	EQUIVALENT USA STEEL WIRE THICKNESS inch	GAGE NO.
6.20	0.244	3
5.72	0.225	4
5.26	0.207	5
4.88	0.192	6
4.50	0.177	7
4.11	0.162	8
3.76	0.148	9
3.43	0.135	10
3.05	0.120	11
2.69	0.106	12
2.34	0.092	13
2.03	0.080	14
1.83	0.072	15
1.57	0.062	16
1.37	0.054	17
1.22	0.048	18
1.04	0.041	19
0.89	0.035	20

CONVERSION TABLE FOR PIPE PILES

METRIC SIZE SHOWN ON THE PLANS mm x mm	EQUIVALENT IMPERIAL SIZE inch x inch
PP 360 x 4.55	NPS 14 x 0.179
PP 360 x 6.35	NPS 14 x 0.250
PP 360 x 9.53	NPS 14 x 0.375
PP 360 x 11.12	NPS 14 x 0.438
PP 406 x 12.70	NPS 16 x 0.500
PP 460 x T	NPS 18 x T"
PP 508 x T	NPS 20 x T"
PP 559 x T	NPS 22 x T"
PP 610 x T	NPS 24 x T"
PP 660 x T	NPS 26 x T"
PP 711 x T	NPS 28 x T"
PP 762 x T	NPS 30 x T"
PP 813 x T	NPS 32 x T"
PP 864 x T	NPS 34 x T"
PP 914 x T	NPS 36 x T"
PP 965 x T	NPS 38 x T"
PP 1016 x T	NPS 40 x T"
PP 1067 x T	NPS 42 x T"
PP 1118 x T	NPS 44 x T"
PP 1219 x T	NPS 48 x T"
PP 1524 x T	NPS 60 x T"

The thickness in inches (T") represents an exact conversion of the metric thickness in millimeters (T).

CONVERSION TABLE FOR STRUCTURAL TIMBER AND LUMBER

METRIC MINIMUM DRESSED DRY, SHOWN ON THE PLANS mm x mm	METRIC MINIMUM DRESSED GREEN, SHOWN ON THE PLANS mm x mm	EQUIVALENT NOMINAL US SIZE inch x inch
19x89	20x90	1x4
38x89	40x90	2x4
64x89	65x90	3x4
89x89	90x90	4x4
140x140	143x143	6x6
140x184	143x190	6x8
184x184	190x190	8x8
235x235	241x241	10x10
286x286	292x292	12x12

CONVERSION TABLE FOR NAILS AND SPIKES

METRIC COMMON NAIL, SHOWN ON THE PLANS Length, mm Diameter, mm	METRIC BOX NAIL, SHOWN ON THE PLANS Length, mm Diameter, mm	METRIC SPIKE, SHOWN ON THE PLANS Length, mm Diameter, mm	EQUIVALENT IMPERIAL SIZE Penny-weight
50.80 2.87	50.80 2.51	————	6d
63.50 3.33	63.50 2.87	————	8d
76.20 3.76	76.20 3.25	76.20 4.88	10d
82.55 3.76	82.55 3.25	82.55 4.88	12d
88.90 4.11	88.90 3.43	88.90 5.26	16d
101.60 4.88	101.60 3.76	101.60 5.72	20d
114.30 5.26	114.30 3.76	114.30 6.20	30d
127.00 5.72	127.00 4.11	127.00 6.68	40d
————	————	139.70 7.19	50d
————	————	152.40 7.19	60d

8-1.02 APPROVED TRAFFIC PRODUCTS

The Department maintains a List of Approved Traffic Products. The Engineer shall not be precluded from sampling and testing products on the List of Approved Traffic Products.

The manufacturer of products on the List of Approved Traffic Products shall furnish the Engineer a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each type of traffic product supplied.

The following is the List of Approved Traffic Products:

PAVEMENT MARKERS, PERMANENT TYPE

RETROREFLECTIVE

Apex, Model 921 (100 mm x 100 mm)
Ray-O-Lite, Models SS (100 mm x 100 mm), RS (100 mm x 100 mm) and AA (100 mm x 100 mm)
Stimsonite, Models 88 (100 mm x 100 mm), 911 (100 mm x 100 mm), 953 (70 mm x 114 mm)
3M Series 290 (89 mm x 100 mm)

RETROREFLECTIVE WITH ABRASION RESISTANT SURFACE (ARS)

Ray-O-Lite "AA" ARS (100 mm x 100 mm)
Stimsonite, Models 911 (100 mm x 100 mm), 953 (70 mm x 114 mm)
3M Series 290 (89 mm x 100 mm)

RETROREFLECTIVE WITH ABRASION RESISTANT SURFACE (ARS) (Used for recessed applications)

Stimsonite, Model 948 (58 mm x 119 mm)
Ray-O-Lite, Model 2002 (58 mm x 117 mm)
Stimsonite, Model 944SB (51 mm x 100 mm)*
Ray-O-Lite, Model 2004 ARS (51 mm x 100 mm)*

*For use only in 114 mm wide (older) recessed slots

NON-REFLECTIVE FOR USE WITH EPOXY ADHESIVE, 100 mm Round

Apex Universal (Ceramic)
Highway Ceramics, Inc. (Ceramic)

NON-REFLECTIVE FOR USE WITH BITUMEN ADHESIVE, 100 mm Round

Apex Universal (Ceramic)
Apex Universal, Model 929 (ABS)
Elgin Molded Plastics, "Empco-Lite" Model 900 (ABS)
Highway Ceramics, Inc. (Ceramic)
Hi-Way Safety, Inc., Models P20-2000W and 2001Y (ABS)
Interstate Sales, "Diamond Back" (ABS) and (Polypropylene)
Alpine Products, D-Dot (ABS)
Road Creations, Model RCB4NR (Acrylic)

PAVEMENT MARKERS, TEMPORARY TYPE

TEMPORARY MARKERS FOR LONG TERM DAY/NIGHT USE (6 months or less)

Apex Universal, Model 924 (100 mm x 100 mm)
Davidson Plastics Corp., Model 3.0 (100 mm x 100 mm)
Elgin Molded Plastics, "Empco-Lite" Model 901 (100 mm x 100 mm)
Road Creations, Model R41C (100 mm x 100 mm)
Vega Molded Products "Temporary Road Marker" (75 mm x 100 mm)

TEMPORARY MARKERS FOR SHORT TERM DAY/NIGHT USE (14 days or less) (For seal coat or chip seal applications, clear protective covers are required)

Apex Universal, Model 932
Davidson Plastics, Models T.O.M., T.R.P.M., and "HH" (High Heat)
Hi-Way Safety, Inc., Model 1280/1281

STRIPING AND PAVEMENT MARKING MATERIALS

PERMANENT TRAFFIC STRIPING AND PAVEMENT MARKING TAPE

Advanced Traffic Marking, Series 300 and 400
Brite-Line, Series 1000
Swarco Industries, "Director 35" (For transverse application only)
Swarco Industries, "Director 60"
3M, "Stamark" Series 380 and 5730
3M, "Stamark" Series A320 Bisymmetric (For use on low-volume roadways only)
3M, "Stamark" Series A420, A440, N420, and N440 (For transverse application only)

TEMPORARY (REMOVABLE) STRIPING AND PAVEMENT MARKING TAPE (6 months or less)

Brite-Line, Series 100
P.B. Laminations, Aztec, Grade 102
Swarco Industries, "Director-2"
3M, "Stamark," Series A620
3M Series A145 Removable Black Line Mask
(Black Tape: For use only on Asphalt Concrete Surfaces)
Advanced Traffic Marking Black "Hide-A-Line"
(Black Tape: For use only on Asphalt Concrete Surfaces)

PREFORMED THERMOPLASTIC (Heated in place)

Flint Trading, "Premark" and "Premark 20/20 Flex"
Pavemark, "Hotape"

REMOVABLE TRAFFIC PAINT

Belpro, Series 250/252 and No. 93 Remover

CLASS 1 DELINEATORS

ONE-PIECE DRIVEABLE FLEXIBLE TYPE, 1700 mm

Carsonite, Curve-Flex CFRM-400
Carsonite, Roadmarker CRM-375
Davidson Plastics, "Flexi-Guide Models 400 and 566"
FlexStake, Model 654TM
GreenLine Models HWD1-66 and CGD1-66
J. Miller Industries, Model JMI-375 (with soil anchor)

SPECIAL USE FLEXIBLE TYPE, 1700 mm

Carsonite, "Survivor" with 450 mm U-Channel base
FlexStake, Model 604
GreenLine Models HWD and CGD (with 450 mm U-Channel base)
Safe-Hit with 200 mm pavement anchor (SH248-GP1)
Safe-Hit with 380 mm soil anchor (SH248-GP2) and with 450 mm soil anchor (SH248-GP3)

SURFACE MOUNT FLEXIBLE TYPE, 1200 mm

Bent Manufacturing Company, "Masterflex" Model MF-180EX-48
Carsonite, "Super Duck II"
FlexStake, Surface Mount, Models 704 and 754TM

CHANNELIZERS

SURFACE MOUNT TYPE, 900 mm

Bent Manufacturing Company, "Masterflex" Models MF-360-36 (Round) and MF-180-36 (Flat)
Carsonite, "Super Duck" (Flat SDF-436, Round SDR-336)
Carsonite, Super Duck II Model SDCF203601MB "The Channelizer"
Davidson Plastics, Flex-Guide Models FG300LD and FG300UR
FlexStake, Surface Mount, Models 703 and 753TM
GreenLine, Model SMD-36
The Line Connection, "Dura-Post" Model DP36-3 (Permanent)
The Line Connection, "Dura-Post" Model DP36-3C (Temporary)
Repo, Models 300 and 400
Safe-Hit, Guide Post, Model SH236SMA

CONICAL DELINEATORS, 1070 mm

(For 700 mm Traffic Cones, see Standard Specifications)

Bent Manufacturing Company "T-Top"
Plastic Safety Systems "Navigator-42"
Roadmaker Company "Stacker"
TraFFix Devices "Grabber"

OBJECT MARKERS

TYPE "K", 450 mm

Carsonite, Model SMD-615
FlexStake, Model 701KM
Repo, Models 300 and 400
Safe-Hit, Model SH718SMA
The Line Connection, Model DP21-4K

TYPE "K-4", 450-600 mm

(Shown as Type "Q" in the Traffic Manual)

Carsonite, Super Duck II
FlexStake, Model 701KM
Repo, Models 300 and 400
Safe-Hit, Models SH8 24SMA_WA and SH8 24GP3_WA
The Line Connection, Model DP21-4Q

TEMPORARY RAILING (TYPE K) REFLECTORS AND CONCRETE BARRIER MARKERS

IMPACTABLE TYPE

ARTUK, "FB"
Davidson Plastics, Model PCBM-12
Duraflex Corp., "Flexx 2020" and "Electriflexx"

NON-IMPACTABLE TYPE

ARTUK, JD Series
Stimsonite, Model 967 (with 83 mm Acrylic cube corner reflector)
Stimsonite, Model 967LS
Vega Molded Products, Models GBM and JD

THREE BEAM BARRIER MARKERS

(For use to the left of traffic)

Duraflex Corp., "Railrider"

Davidson Plastics, "Mini" (75 mm x 254 mm)

CONCRETE BARRIER DELINEATORS, 400 mm

(For use to the right of traffic. When mounted on top of barrier, places top of reflective element at 1200 mm)

Davidson Plastics, Model PCBM T-16

Safe-Hit, Model SH216RBM

CONCRETE BARRIER-MOUNTED MINI-DRUM

(260 mm x 360 mm x 570 mm)

Stinson Equipment Company "SaddleMarker"

SOUND WALL DELINEATOR

(Applied to a vertical surface. Top of reflective element at 1200 mm)

Davidson Plastics, PCBM S-36

GUARD RAILING DELINEATOR

(Top of reflective element at 1200 mm above plane of roadway)

WOOD POST TYPE, 686 mm

Carsonite, Model 427

Davidson Plastics FG 427 and FG 527

FlexStake, Model 102 GR

GreenLine GRD 27

J. Miller Model JMI-375G

Safe-Hit, Model SH227GRD

STEEL POST TYPE

Carsonite, Model CFGR-327 with CFGRBK300 Mounting Bracket

RETROREFLECTIVE SHEETING FOR:

CHANNELIZERS, BARRIER MARKERS, AND DELINEATORS

3M, High Intensity

Reflexite, PC-1000 Metalized Polycarbonate

Reflexite, AC-1000 Acrylic

Reflexite, AP-1000 Metalized Polyester

Reflexite, AR-1000 Abrasion Resistant Coating

Stimsonite, Series 6200 (For rigid substrate devices only)

TRAFFIC CONES, 330 mm Sleeves

Reflexite SB (Polyester), Vinyl or "TR" (Semi-transparent)

TRAFFIC CONES, 100 mm and 150 mm Sleeves

3M Series 3840

Reflexite Vinyl, "TR" (Semi-transparent) or "Conformalite"

BARRELS AND DRUMS

Reflexite, "Super High Intensity" or "High Impact Drum Sheeting"
3M Series 3810

BARRICADES: Type I, Engineering Grade

American Decal, Adcolite
Avery Dennison, 1500 and 1600
3M, Scotchlite, Series CW

BARRICADES: Type II, Super Engineering Grade

Avery Dennison, "Fasign" 2500 Series
Kiwalite Type II
Nikkalite 1800 Series

SIGNS: Type II, Super Engineering Grade

Avery Dennison, "Fasign" 2500 Series
Kiwalite, Type II
Nikkalite 1800 Series

SIGNS: Type III, High-Intensity Grade

3M Series 3800
Nippon Carbide, Nikkalite Brand Ultralite Grade II

SIGNS: Type IV, High-Intensity Prismatic Grade

Stimsonite Series 6200

SIGNS: Type VII, High-Intensity Prismatic Grade

3M Series 3900

SIGNS: Type VI, Roll-Up Signs

Reflexite, Vinyl (Orange), Reflexite "SuperBright" (Fluorescent orange)
3M Series RS34 (Orange) and RS20 (Fluorescent orange)

SIGN SUBSTRATE FOR CONSTRUCTION AREA SIGNS

ALUMINUM

FIBERGLASS REINFORCED PLASTIC (FRP)

Sequentia, "Polyplate"
Fiber-Brite

8-1.03 STATE-FURNISHED MATERIALS

Attention is directed to Section 6-1.02, "State-Furnished Materials," of the Standard Specifications and these special provisions.

Padlocks for the backflow preventer assembly enclosures and irrigation controller enclosure cabinets will be furnished to the Contractor.

Water meter installations will be arranged for the Contractor.

8-1.04 SLAG AGGREGATE

Aggregate produced from slag resulting from any steel-making process or from air-cooled iron blast furnace slag shall not be used on this project.

SECTION 8-2. CONCRETE

8-2.01 PORTLAND CEMENT CONCRETE

Portland cement concrete shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

Unless the use of mineral admixture is prohibited, whenever the word "cement" is found in the Standard Specifications or the special provisions, it shall be understood to mean "cementitious material" when both of the following conditions are met:

- A. The cement content of portland cement concrete is specified, and
- B. Section 90, "Portland Cement Concrete," of the Standard Specifications is referenced.

Portland cement concrete that is produced using equipment where the cement and mineral admixture are proportioned in the same weigh hopper shall be sampled and tested by the Contractor, in the presence of the Engineer, for mix uniformity in conformance with the requirements of ASTM Designation: C 94 Section 11, "Mixing and Delivery," and "Annex A1." The testing shall be performed on concrete produced using an approved project mix design and may be done at the project concrete placement site.

The batch plant producing the portland cement concrete for the project shall have met the requirements of California Test 109 within one year prior to producing concrete for the project.

Sampling for mix uniformity tests shall be performed the first time portland cement concrete, of sufficient volume to perform these tests, is placed on the project. All test results shall be presented to the Engineer no later than 10 days after completion of sampling.

Test results from mixer uniformity testing will not be used for contract compliance, acceptance, or payment.

Prior to placing any concrete on the project, the Contractor shall supply a list of all portland cement concrete mixers to be used. When truck mixers are to be used, the list shall contain the truck identification number, mixer brand, mixer age and mixer condition.

When truck mixers are used, the mix uniformity testing shall be performed on 5 truck mixers per project. The truck mixers selected for testing shall be representative of the different mixer brands, ages, and conditions of the mixers on the list and approved by the Engineer. Mixer selection shall be completed before mix uniformity testing is started. Sampling for the mix uniformity tests from each of the 5 mixers shall be completed within the same work shift, unless otherwise approved in writing by the Engineer. The Contractor shall notify the Engineer, in writing, a minimum of 24 hours prior to performing the sampling for these tests. The letter of notification shall include 1) the truck mixer information, 2) the specific gravity of the coarse aggregate in the mix to be tested, and 3) a copy of the current ACI "Concrete Field Testing Technician, Grade 1" certification for each tester who will perform testing for the Contractor. The Contractor shall provide an adequate number of testers to successfully perform the testing with a minimum amount of impact to the Contractor's operations.

When concrete is completely mixed in stationary mixers, each mixer used for the project shall be tested one time.

Full compensation for the testing of mix uniformity as specified herein will be considered as included in the contract price paid for the concrete work involved and no additional compensation will be allowed therefor.

Unless otherwise specified, Type C accelerating chemical admixture conforming to the requirements of ASTM Designation: C 494, may be used in portland cement concrete for precast steam cured concrete members.

Unless otherwise specified, mineral admixture will not be required in portland cement concrete used for precast, provided all surfaces of the member, except those that will be embedded in concrete, are sealed with one coat of concrete sealant conforming to the following:

The sealant shall be a product designed to seal concrete against moisture. The sealant shall be 40 percent, minimum, organosilane solution, diluted in a suitable solvent, and shall consist of alkyltrimethoxysilanes with alkyl groups of i-butyl, i-octyl, n-octyl, singularly or in combination. The sealant shall be tinted with a fugitive dye so that the surface of the member remains colored, for a minimum of 4 hours and a maximum of 7 days, after application of the sealant.

The sealant shall seal the surfaces of the member so that 5 days after application of the sealant, there shall be no change in the appearance of the surface when sprayed with water.

Members to receive the sealant shall have attained the 28-day compressive strength as shown on the plans and member surfaces shall be dry for a minimum of 48 hours prior to applying the sealant.

Each shipment of concrete sealant shall be accompanied by the manufacturer's recommendations for application and a Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

Unless otherwise specified, the sealant shall be applied in conformance with the manufacturer's recommendations.

The sealant shall be applied when the atmospheric temperature is between 5°C and 38°C and the wind velocity is less than 2.25 m/s. The sealant shall be applied at a coverage rate of approximately 3.0 m²/L, using an airless sprayer with 140 kPa pressure, maximum. The sprayer shall be equipped with a calibrated pressure gauge showing the pressure during the spraying operation.

Subject to written approval of the Engineer, the Contractor may provide suitable enclosures to permit sealing of the members during inclement weather and may use rollers to apply the sealant for small areas.

Twenty-four hours after application of the concrete sealant, the Contractor shall apply a fine water spray using water conforming to the requirements of Section 90-2.03, "Water," of the Standard Specifications. The spray shall be applied uniformly to all surfaces of the member until they are completely wet. There shall not be excessive runoff of water resulting from the spraying operation.

Five days after the sealant application, the Contractor shall spray surfaces of the member, in areas designated by the Engineer, with a water spray to verify sealant coverage. Surfaces that lack sufficient sealant coverage shall be sealed again in conformance with the requirements specified herein.

Section 90-1.01, "Description," of the Standard Specifications is amended to read:

90-1.01 Description.—Portland cement concrete shall be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water, proportioned and mixed as specified in these specifications.

Unless otherwise specified, cementitious material to be used in portland cement concrete shall conform to the requirements for cement and mineral admixtures in Section 90-2, "Materials" and shall be either: 1) "Type IP (MS) Modified" cement; or 2) a combination of "Type II Modified" portland cement and mineral admixture.

Concrete for each portion of the work shall comply with the requirements for the Class, cementitious material content in kilograms per cubic meter, 28-day compressive strength, minor concrete, or commercial quality concrete, as shown on the plans or specified in these specifications or the special provisions.

Class 1 concrete shall contain not less than 400 kg of cementitious material per cubic meter.

Class 2 concrete shall contain not less than 350 kg of cementitious material per cubic meter.

Class 3 concrete shall contain not less than 300 kg of cementitious material per cubic meter.

Class 4 concrete shall contain not less than 250 kg of cementitious material per cubic meter.

Minor concrete shall contain not less than 325 kg of cementitious material per cubic meter unless otherwise specified in these specifications or the special provisions.

Unless otherwise designated on the plans or specified in these specifications or the special provisions, the amount of cementitious material used per cubic meter of concrete in structures or portions of structures shall conform to the following:

Use	Cementitious Material Content (kg/m ³)
Concrete which is designated by compressive strength:	
Deck slabs and slab spans of bridges	400 min., 475 max.
Roof sections of exposed top box culverts	400 min., 475 max.
Other portions of structures	350 min., 475 max.
Concrete not designated by compressive strength:	
Deck slabs and slab spans of bridges	400 min.
Roof sections of exposed top box culverts	400 min.
Prestressed members	400 min.
Seal courses	400 min.
Other portions of structures	350 min.
Concrete for precast members	350 min., 550 max.

Whenever the 28-day compressive strength shown on the plans is greater than 25 MPa, the concrete shall be considered to be designated by compressive strength. If the plans show a 28-day compressive strength which is 31 MPa or greater, an additional 7 days will be allowed to obtain the specified strength. The 28-day compressive strengths shown on the plans which are 25 MPa or less, are shown for design information only and are not to be considered a requirement for acceptance of the concrete.

Concrete designated by compressive strength shall be proportioned such that the concrete will conform to the strength shown on the plans or specified in the special provisions.

The Contractor shall determine the mix proportions for all concrete except pavement concrete. The Engineer will determine the mix proportions for pavement concrete.

Before using concrete for which the mix proportions have been determined by the Contractor, or in advance of revising those mix proportions, the Contractor shall submit in writing to the Engineer a copy of the mix design.

Compliance with cementitious material content requirements will be verified in conformance with procedures described in California Test 518 for cement content. For testing purposes, mineral admixture shall be considered to be cement. Batch proportions shall be adjusted as necessary to produce concrete having the specified cementitious material content.

If any concrete used in the work has a cementitious material content, consisting of cement, mineral admixture, or cement plus mineral admixture, which is less than the minimum required for the work, the concrete shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and the Contractor shall pay to the State \$0.55 for each kilogram of cement, mineral admixture, or cement plus mineral admixture which is less than the minimum required for the work. The Department may deduct the amount from any monies due, or that may become due, the Contractor under the contract. The deductions will not be made unless the difference between the contents required and those actually provided exceeds the batching tolerances permitted by Section 90-5, "Proportioning." No deductions for cementitious material content will be made based on the results of California Test 518.

The requirements of the preceding paragraph shall not apply to minor concrete nor commercial quality concrete.

All concrete for which the mix proportions are determined either by the Contractor or the Engineer shall conform to the requirements of this Section 90.

The first paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is amended to read:

90-2.01 Portland Cement.—Unless otherwise specified, portland cement shall be either "Type IP (MS) Modified" cement or "Type II Modified" portland cement.

"Type IP (MS) Modified" cement shall conform to the specifications for Type IP (MS) cement in ASTM Designation: C 595, and shall be comprised of an intimate mixture of Type II cement and not more than 25 percent of a mineral admixture. The type and minimum amount of mineral admixture used in the manufacture of "Type IP (MS) Modified" cement shall be in conformance with the provisions of Section 90-4.08, "Required Use of Mineral Admixtures."

"Type II Modified" portland cement shall conform to the specifications for Type II portland cement in ASTM Designation: C 150.

In addition, "Type IP (MS) Modified" cement and "Type II Modified" portland cement shall conform to the following requirements:

- A. The cement shall not contain more than 0.60 percent by mass of alkalis, calculated as the percentage of Na₂O plus 0.658 times the percentage of K₂O, when determined by either direct intensity flame photometry or by the atomic absorption method. The instrument and procedure used shall be qualified as to precision and accuracy in conformance with the requirements of ASTM Designation: C 114.
- B. The autoclave expansion shall not exceed 0.50 percent.
- C. Mortar, containing the cement to be used and Ottawa sand, when tested in conformance with California Test 527, shall not expand in water more than 0.010 percent and shall not contract in air more than 0.048 percent except that when cement is to be used for precast prestressed concrete piling, precast prestressed concrete members or steam cured concrete products, the mortar shall not contract in air more than 0.053 percent.

The second paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is amended to read:

Type III and Type V portland cements shall conform to the specifications in ASTM Designation: C 150, and the additional requirements listed above for Type II Modified portland cement, except that when tested in conformance with California Test 527, mortar containing Type III portland cement shall not contract in air more than 0.075 percent.

The third paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is deleted.

The twelfth paragraph in Section 90-2.02, "Aggregates," of the Standard Specifications is deleted.

The first paragraph in Section 90-2.03, "Water," of the Standard Specifications is amended to read:

90-2.03 Water.—In conventionally reinforced concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 1,000 parts per million of chlorides as Cl, nor more than 1,300 parts per million of sulfates as SO₄. In prestressed concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 650 parts per million of chlorides as Cl, nor more than 1,300 parts per million of sulfates as SO₄. In no case shall the water contain an amount of impurities that will cause either: 1) a change in the setting time of cement of more than 25 percent when tested in conformance with ASTM Designation: C 191 or ASTM Designation: C 266; or 2) a reduction in the compressive strength of mortar at 14 days of more than 5 percent, when tested in conformance with ASTM Designation: C 109, when compared to the results obtained with distilled water or deionized water, tested in conformance with ASTM Designation: C 109.

The following section is added to Section 90-2, "Materials," of the Standard Specifications:

90-2.04 Admixture Materials.—Admixture materials shall conform to the requirements of the ASTM Designations shown below:

Chemical Admixtures—ASTM Designation: C 494.

Air-entraining Admixtures—ASTM Designation: C 260.

Calcium Chloride—ASTM Designation: D 98.

Mineral Admixtures—Coal fly ash, raw or calcined natural pozzolan as specified in ASTM Designation: C 618, except that the loss on ignition shall not exceed 4 percent, or, silica fume as specified in ASTM Designation: C 1240, with reduction of mortar expansion of 80 percent, minimum, using the cement from the proposed mix design.

Mineral admixtures shall be used in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

Section 90-4.02, "Materials," of the Standard Specifications is amended to read:

90-4.02 Materials.—Admixture materials shall be as specified in Section 90-2.04, "Admixture Materials."

Section 90-4.05, "Optional Use of Chemical Admixtures," of the Standard Specifications is amended to read:

90-4.05 Optional Use of Chemical Admixtures.—The Contractor will be permitted to use Type A or F, water-reducing; Type B, retarding; or Type D or G, water-reducing and retarding admixtures as described in ASTM Designation: C 494 to conserve cementitious material or to facilitate any concrete construction application subject to the following conditions:

When a water-reducing admixture or a water-reducing and retarding admixture is used, the cementitious material content specified or ordered may be reduced by a maximum of 5 percent by mass except that the resultant cementitious material content shall be not less than 300 kilograms per cubic meter.

When a reduction in cementitious material content is made, the dosage of admixture used shall be the dosage used in determining approval of the admixture.

Section 90-4.07, "Optional Use of Air-entraining Admixtures," of the Standard Specifications is amended to read:

90-4.07 Optional Use of Air-entraining Admixtures.—When air-entrainment has not been specified or ordered by the Engineer, the Contractor will be permitted to use an air-entraining admixture to facilitate the use of any construction procedure or equipment provided that the average air content, as determined by California Test 504, of 3 successive tests does not exceed 4 percent and no single test value exceeds 5.5 percent. If the Contractor elects to use an air-entraining admixture in concrete for pavement, the Contractor shall so indicate at the time the Contractor designates the source of aggregate as provided in Section 40-1.015, "Cement Content."

Section 90-4.08, "Required Use of Mineral Admixtures," of the Standard Specifications is amended to read:

90-4.08 Required Use of Mineral Admixtures.—Unless otherwise specified, mineral admixture shall be combined with cement to make cementitious material for use in portland cement concrete.

The calcium oxide content of mineral admixtures shall not exceed 10 percent and the available alkali, as sodium oxide equivalent, shall not exceed 1.5 percent when measured in conformance with the requirements of ASTM Designation: C 618.

The amounts of cement and mineral admixture used in cementitious material for portland cement concrete shall be sufficient to satisfy the minimum cementitious material content requirements specified in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," and shall conform to the following:

The minimum amount of cement shall not be less than 75 percent by mass of the specified minimum cementitious material content.

The minimum amount of mineral admixture to be combined with cement shall be determined using one of the following criteria:

- A. When the calcium oxide content of a mineral admixture, measured in conformance with the requirements of ASTM Designation: C 618 and Section 90-2.04, "Admixture Materials," is equal to or less than 2 percent by mass, the amount of mineral admixture shall not be less than 15 percent by mass of the total amount of cementitious material to be used in the mix.
- B. When the calcium oxide content of a mineral admixture, measured in conformance with the requirements of ASTM Designation: C 618 and Section 90-2.04, "Admixture Materials," is greater than 2 percent, the amount of mineral admixture shall not be less than 25 percent by mass of the total amount of cementitious material to be used in the mix.
- C. When a mineral admixture is used, which conforms to the requirements for silica fume in Section 90-2.04, "Admixture Materials," is used, the amount of mineral admixture shall not be less than 10 percent by mass of the total amount of cementitious material to be used in the mix.

If more than the required amount of cementitious material is used, the additional cementitious material in the mix may be either cement, any mineral admixture conforming to the requirements of Section 90-2.04, "Admixture Materials," or a combination of both; however, the maximum total amount of mineral admixture shall not exceed 35 percent by mass of the total amount of cementitious material to be used in the mix. Where Section 90-1.01, "Description," specifies a maximum cementitious content in kilograms per cubic meter, the total mass of cement and mineral admixture per cubic meter shall not exceed the specified maximum cementitious material content.

Section 90-4.09, "Optional Use of Mineral Admixture," of the Standard Specifications is deleted.

Section 90-4.11, "Storage, Proportioning, and Dispensing of Mineral Admixtures," of the Standard Specifications is amended to read:

90-4.11 Storage, Proportioning, and Dispensing of Mineral Admixtures.—Mineral admixtures shall be protected from exposure to moisture until used. Sacked material shall be piled to permit access for tally, inspection and identification for each shipment.

Adequate facilities shall be provided to assure that mineral admixtures meeting the specified requirements are kept separate from other mineral admixtures in order to prevent any but the specified mineral admixtures from entering the work. Safe and suitable facilities for sampling mineral admixtures shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper.

Mineral admixtures shall be incorporated into concrete using equipment conforming to the requirements for cement weigh hoppers, and charging and discharging mechanisms in ASTM Designation: C 94, in Section 90-5.03, "Proportioning," and in this Section 90-4.11.

When interlocks are required for cement and mineral admixture charging mechanisms by Section 90-5.03A, "Proportioning for Pavement," and cement and mineral admixtures are weighed cumulatively, their charging mechanisms shall be interlocked to prevent the introduction of mineral admixture until the mass of cement in the cement weigh hopper is within the tolerances specified in Section 90-5.02, "Proportioning Devices."

Mineral admixture used in concrete for exposed surfaces of like elements of a structure shall be from the same source and of the same percentage.

Section 90-5.02, "Proportioning Devices," of the Standard Specifications is amended to read:

90-5.02 Proportioning Devices.—All weighing, measuring or metering devices used for proportioning materials shall conform to the requirements in Section 9-1.01, "Measurement of Quantities," and this Section 90-5.02. In addition, any automatic weighing systems used shall comply with the requirements for automatic proportioning devices in Section 90-5.03A, "Proportioning for Pavement." These automatic devices shall be automatic to the extent that the only manual

operation required for proportioning the aggregates, cement, and mineral admixture for one batch of concrete is a single operation of a switch or starter.

Proportioning devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to insure their accuracy.

Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the plant is in operation, the mass of each batch of material shall not vary from the mass designated by the Engineer by more than the tolerances specified herein.

Equipment for cumulative weighing of aggregate shall have a zero tolerance of ± 0.5 percent of the designated total batch mass of the aggregate. For systems with individual weigh hoppers for the various sizes of aggregate, the zero tolerance shall be ± 0.5 percent of the individual batch mass designated for each size of aggregate. Equipment for cumulative weighing of cement and mineral admixtures shall have a zero tolerance of ± 0.5 percent of the designated total batch mass of the cement and mineral admixture. Equipment for weighing cement or mineral admixture separately shall have a zero tolerance of ± 0.5 percent of their designated individual batch masses. Equipment for measuring water shall have a zero tolerance of ± 0.5 percent of its designated mass or volume.

The mass indicated for any batch of material shall not vary from the preselected scale setting by more than the following:

- A. Aggregate weighed cumulatively shall be within 1.0 percent of the designated total batch mass of the aggregate. Aggregates weighed individually shall be within 1.5 percent of their respective designated batch masses.
- B. Cement shall be within 1.0 percent of its designated batch mass. When weighed individually, mineral admixture shall be within 1.0 percent of its designated batch mass. When mineral admixture and cement are permitted to be weighed cumulatively, cement shall be weighed first to within 1.0 percent of its designated batch mass, and the total for cement and mineral admixture shall be within 1.0 percent of the sum of their designated batch masses.
- C. Water shall be within 1.5 percent of its designated mass or volume.

Each scale graduation shall be approximately 0.001 of the total capacity of the scale. The capacity of scales for weighing cement, mineral admixture, or cement plus mineral admixture and aggregates shall not exceed that of commercially available scales having single graduations indicating a mass not exceeding the maximum permissible mass variation above, except that no scale shall be required having a capacity of less than 500 kg, with 0.5 kg graduations.

Section 90-5.03, "Proportioning," excluding Section 90-5.03A, "Proportioning for Pavement," of the Standard Specifications is amended to read:

90-5.03 Proportioning.—Proportioning shall consist of dividing the aggregates into the specified sizes, each stored in a separate bin, and combining them with cement, mineral admixture and water as provided in these specifications. Aggregates shall be proportioned by mass.

At the time of batching, all aggregates shall have been dried or drained sufficiently to result in a stable moisture content such that no visible separation of water from aggregate will take place during transportation from the proportioning plant to the point of mixing. In no event shall the free moisture content of the fine aggregate at the time of batching exceed 8 percent of its saturated, surface-dry mass.

Should separate supplies of aggregate material of the same size group, but of different moisture content or specific gravity or surface characteristics affecting workability, be available at the proportioning plant, withdrawals shall be made from one supply exclusively and the materials therein completely exhausted before starting upon another.

Bulk "Type IP (MS) Modified" cement, that conforms to the requirements in Section 90-2.01, "Portland Cement," shall be weighed in an individual hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer.

Bulk cement to be blended with mineral admixture for use in portland cement concrete for pavement and structures may be weighed in separate, individual weigh hoppers or may be weighed in the same weigh hopper with mineral admixture and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer. If the cement and mineral admixture are weighed cumulatively, the cement shall be weighed first.

When cement and mineral admixtures are weighed in separate weigh hoppers, the weigh systems for the proportioning of the aggregate, the cement, and the mineral admixture shall be individual and distinct from all other weigh systems. Each weigh system shall be equipped with a hopper, a lever system, and an indicator to constitute an individual and independent material weighing device. The cement and the mineral admixture shall be discharged into the mixer simultaneously with the aggregate.

The scale and weigh hopper for bulk weighing cement, mineral admixture, and cement plus mineral admixture shall be separate and distinct from the aggregate weighing equipment.

When the source of any aggregate is changed for concrete structures, the Contractor shall adjust the mix proportions and submit in writing to the Engineer a copy of the mix design before using such aggregates. When the source of any aggregate is changed for other concrete, the Engineer shall be allowed sufficient time to adjust the mix and such aggregates shall not be used until necessary adjustments are made.

For all batches with a volume of one cubic meter or more, the batching equipment shall conform to one of the following combinations:

- A. Separate boxes and separate scale and indicator for weighing each size of aggregate.
- B. Single box and scale indicator for all aggregates.
- C. Single box or separate boxes and automatic weighing mechanism for all aggregates.

In order to check the accuracy of batch masses, the gross mass and tare mass of batch trucks, truck mixers, truck agitators, and non-agitating hauling equipment shall be determined when ordered by the Engineer. The equipment shall be weighed at the Contractor's expense on scales designated by the Engineer.

Section 90-5.03A, "Proportioning for Pavement," of the Standard Specifications is amended to read:

90-5.03A Proportioning for Pavement.—Aggregates and bulk cement, mineral admixture, and cement plus mineral admixture for use in pavement shall be proportioned by mass by means of automatic proportioning devices of approved type conforming to the requirements specified in this Section 90-5.03A.

The Contractor shall install and maintain in operating condition an electrically actuated moisture meter that will indicate, on a readily visible scale, changes in the moisture content of the fine aggregate as it is batched within a sensitivity of 0.5 percent by mass of the fine aggregate.

The batching of cement, mineral admixture, or cement plus mineral admixture and aggregate shall be interlocked so that a new batch cannot be started until all weigh hoppers are empty, the proportioning devices are within zero tolerance, and the discharge gates are closed. The interlock shall permit no part of the batch to be discharged until all aggregate hoppers and the cement and mineral admixture hoppers or the cement plus mineral admixture hopper are charged with masses which are within the tolerances specified in Section 90-5.02, "Proportioning Devices."

The discharge gate on the cement and mineral admixture hoppers or the cement plus mineral admixture hopper shall be designed to permit regulating the flow of cement, mineral admixture, or cement plus mineral admixture into the aggregate as directed by the Engineer.

When separate weigh boxes are used for each size of aggregate, the discharge gates shall permit regulating the flow of each size of aggregate as directed by the Engineer.

Material discharged from the several bins shall be controlled by gates or by mechanical conveyors. The means of withdrawal from the several bins, and of discharge from the weigh box, shall be interlocked so that not more than one bin can discharge at a time, and that the weigh box cannot be tripped until the required quantity from each of the several bins has been deposited therein. Should a separate weigh box be used for each size of aggregate, all may be operated and discharged simultaneously.

When the discharge from the several bins is controlled by gates, each gate shall be actuated automatically so that the required mass is discharged into the weigh box, after which the gate shall automatically close and lock.

The automatic weighing system shall be designed so that all proportions required may be set on the weighing controller at the same time.

The third paragraph in Section 90-6.01, "General," of the Standard Specifications is amended to read:

All concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of undispersed cement, mineral admixture, or cement plus mineral admixture.

The third and fourth paragraphs in Section 90-6.02, "Machine Mixing," of the Standard Specifications are amended to read:

The batch shall be so charged into the mixer that some water will enter in advance of cementitious materials and aggregates. All water shall be in the drum by the end of the first one-fourth of the specified mixing time.

Cementitious materials shall be batched and charged into the mixer by means that will not result either in loss of cementitious materials due to the effect of wind, or in accumulation of cementitious materials on surfaces of conveyors or hoppers, or in other conditions which reduce or vary the required quantity of cementitious material in the concrete mixture.

The sixth paragraph in Section 90-6.02, "Machine Mixing," of the Standard Specifications is amended to read:

The total elapsed time between the intermingling of damp aggregates and all cementitious materials and the start of mixing shall not exceed 30 minutes.

The seventh through tenth paragraphs in Section 90-6.03, "Transporting Mixed Concrete," of the Standard Specifications are amended to read:

When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within 1.5 hours, or before 250 revolutions of the drum or blades, whichever comes first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30° C, or above, a time less than 1.5 hours may be required.

When non-agitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be completed within one hour after the addition of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30° C, or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.

Each load of concrete delivered at the jobsite shall be accompanied by a weight certificate showing the mix identification number, non-repeating load number, date and time at which the materials were batched, the total amount of water added to the load and for transit-mixed concrete, the reading of the revolution counter at the time the truck mixer is charged with cement. This weight certificate shall also show the actual scale masses (kilograms) for the ingredients batched. Theoretical or target batch masses shall not be used as a substitute for actual scale masses.

Weight certificates shall be provided in printed form, or if approved by the Engineer, the data may be submitted in electronic media. Electronic media shall be presented in a tab-delimited format on 90 mm diskette with a capacity of at least 1.4 megabytes. Captured data, for the ingredients represented by each batch shall be LFCR (one line, separate record) with allowances for sufficient fields to satisfy the amount of data required by these specifications.

The Contractor may furnish a weight certificate that is accompanied by a separate certificate which lists the actual batch masses or measurements for a load of concrete provided that both certificates are 1) imprinted with the same non-repeating load number that is unique to the contract and 2) delivered to the jobsite with the load.

All weight certificates furnished by the Contractor shall conform to the requirements of Section 9-1.01, "Measurement of Quantities."

Section 90-6.05, "Hand-Mixing," of the Standard Specifications is amended to read:

90-6.05 Hand-Mixing.—Hand-mixed concrete shall be made in batches not more than one-fourth cubic meter and shall be mixed on a watertight, level platform. The proper amount of coarse aggregate shall be measured in measuring boxes and spread on the platform and the fine aggregate shall be spread on this layer, the 2 layers being not more than 0.3 meters in total depth. On this mixture shall be spread the dry cement and mineral admixture and the whole mass turned no fewer than 2 times dry; then sufficient clean water shall be added, evenly distributed, and the whole mass again turned no fewer than 3 times, not including placing in the carriers or forms.

The table in the first paragraph in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is amended to read:

Type of Work	Nominal Penetration (mm)	Maximum Penetration (mm)
Concrete pavement	0-25	40
Non-reinforced concrete facilities	0-35	50
Reinforced concrete structures:		
Sections over 300 mm thick	0-35	65
Sections 300 mm thick or less	0-50	75
Concrete placed under water	75-100	115
Cast-in-place concrete piles	65-90	100

The first paragraph following the table of penetration ranges in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is amended to read:

The amount of free water used in concrete shall not exceed 183 kg/m³, plus 20 kg for each required 100 kg of cementitious material in excess of 325 kg/m³.

The fourth paragraph in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is amended to read:

Where there are adverse or difficult conditions which affect the placing of concrete, the above specified penetration and free water content limitations may be exceeded providing the Contractor is granted permission by the Engineer in writing to increase the cementitious material content per cubic meter of concrete. The increase in water and cementitious material shall be at a ratio not to exceed 30 kg of water per added 100 kg of cementitious material per cubic meter. The cost of additional cementitious material and water added under these conditions shall be at the Contractor's expense and no additional compensation will be allowed therefor.

Section 90-9.01, "General," of the Standard Specifications is amended to read:

90-9.01 General.—Concrete compressive strength requirements consist of a minimum strength which must be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified elsewhere or are shown on the plans.

The compressive strength of concrete will be determined from test cylinders which have been fabricated from concrete sampled in conformance with California Test 539. Test cylinders will be molded and initial field cured in conformance with California Test 540. Test cylinders will be cured and tested after receipt at the testing laboratory in conformance with California Test 521. A strength test shall consist of the average strength of 2 cylinders fabricated from material taken from a single load of concrete, except that, if any cylinder should show evidence of improper sampling, molding, or testing, that cylinder shall be discarded and the strength test shall consist of the strength of the remaining cylinder.

When concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member, test cylinders for other than steam cured concrete will be cured in conformance with Method 1 of California Test 540. The compressive strength of concrete determined for these purposes will be evaluated on the basis of individual tests.

When concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete strength to be used as a basis for acceptance of other than steam cured concrete will be determined from cylinders cured in conformance with Method 1 of California Test 540. If the result of a single compressive strength test at the maximum age specified or allowed is below the specified strength but is 95 percent or more of the specified strength, the Contractor shall, at the Contractor's expense, make corrective changes, subject to approval of the Engineer, in the mix proportions or in the concrete fabrication procedures, before placing additional concrete, and shall pay to the State \$14.00 for each in-place cubic meter of concrete represented by the deficient test. If the result of a single compressive strength test at the maximum age specified or allowed is below 95 percent of the specified strength, but is 85 percent or more of the specified strength, the Contractor shall make the corrective changes specified above, and shall pay to the State \$20.00 for each in place cubic meter of concrete represented by the deficient test. In addition, such corrective changes shall be made when the compressive strength of concrete tested at 7 days indicates, in the judgment of the Engineer, that the concrete will not attain the required compressive strength at the maximum age specified or allowed. All concrete represented by a single test which indicates a compressive strength of less than 85 percent of the specified 28-day compressive strength will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials."

If the test result indicates that the compressive strength at the maximum curing age specified or allowed is below the specified strength, but 85 percent or more of the specified strength, payments to the State as required above shall be made, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength of the concrete placed in the work meets or exceeds the specified 28-day compressive strength. If the test result indicates a compressive strength at the maximum curing age specified or allowed below 85 percent, the concrete represented by that test will be rejected, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength and quality of the concrete placed in the work are acceptable. If the evidence consists of tests made on cores taken from the work, the cores shall be obtained and tested in conformance with the specifications of ASTM Designation: C 42.

No single compressive strength test shall represent more than 250 cubic meters.

When a precast concrete member is steam cured, the compressive strength of the concrete will be determined from test cylinders which have been handled and stored in conformance with Method 3 of California Test 540. The compressive strength of steam cured concrete will be evaluated on the basis of individual tests representing specific portions of production. When the concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete shall be considered to be acceptable whenever its compressive strength reaches the specified 28-day compressive strength provided that strength is reached in not more than the maximum number of days specified or allowed after the member is cast.

When concrete is specified by compressive strength, prequalification of materials, mix proportions, mixing equipment, and procedures proposed for use, will be required prior to placement of the concrete. Prequalification shall be accomplished by the submission of acceptable certified test data or trial batch reports by the Contractor. Prequalification data shall be based on the use of materials, mix proportions, mixing equipment, procedures, and size of batch proposed for use in the work.

Certified test data, in order to be acceptable, must indicate that not less than 90 percent of at least 20 consecutive tests exceed the specified strength at the maximum number of cure days specified or allowed, and none of those tests are less than 95 percent of specified strength. Strength tests included in the data shall be the most recent tests made on concrete of the proposed mix design and all shall have been made within one year of the proposed use of the concrete.

Trial batch test reports, in order to be acceptable, must indicate that the average compressive strength of 5 consecutive concrete cylinders, taken from a single batch, at not more than 28 days (or the maximum age allowed) after molding shall be at least 4 MPa greater than the specified 28-day compressive strength, and no individual cylinder shall have a strength less than the specified strength at the maximum age specified or allowed. Data contained in the report shall be from trial batches which were produced within one year of the proposed use of specified strength concrete in the project. Whenever air-entrainment is required, the air content of trial batches shall be equal to or greater than the air content specified for the concrete without reduction due to tolerances.

All tests shall be performed in conformance with either the appropriate California Test methods or the comparable ASTM test methods. All equipment employed in testing shall be in good condition and shall be properly calibrated. If the tests are performed during the life of the contract, the Engineer shall be notified sufficiently in advance of performing the tests in order to witness the test procedures.

The certified test data and trial batch test reports shall include the following information:

- A. Date of mixing.
- B. Mixing equipment and procedures used.
- C. The size of batch in cubic meters and the mass, type and source of all ingredients used.
- D. Penetration of the concrete.
- E. The air content of the concrete if an air-entraining admixture is used.
- F. The age at time of testing and strength of all concrete cylinders tested.

All certified test data and trial batch test reports shall be signed by an official of the firm which performed the tests.

When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower quality is required and the concrete will be paid for as the type or class of concrete required at that location.

After materials, mix proportions, mixing equipment, and procedures for concrete have been prequalified for use, additional prequalification by testing of trial batches will be required prior to making any changes which, in the judgment of the Engineer, could result in a lowering of the strength of the concrete below that specified.

The Contractor's attention is directed to the time required to test trial batches and the Contractor shall be responsible for production of trial batches at a sufficiently early date so that the progress of the work is not delayed.

When precast concrete members are manufactured at the plant of an established manufacturer of precast concrete members, the mix proportions of the concrete shall be determined by the Contractor, and a trial batch and prequalification of the materials, mix proportions, mixing equipment, and procedures will not be required.

Section 90-10.02A, "Portland Cement," of the Standard Specifications is renamed "Cementitious Material" and is amended to read:

90-10.02A Cementitious Material.—Cementitious material shall conform to the provisions in Section 90-1.01, "Description." Compressive strength requirements consist of a minimum strength which must be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified elsewhere or are shown on the plans.

The fifth paragraph in Section 90-10.02B, "Aggregate," of the Standard Specifications is deleted.
Section 90-10.03, "Production," of the Standard Specifications is amended to read:

90-10.03 Production.—Cementitious material, water, aggregate, and admixtures shall be stored, proportioned, mixed, transported, and discharged in conformance with recognized standards of good practice, which will result in concrete that is thoroughly and uniformly mixed, that is suitable for the use intended, and which conforms to requirements specified herein. "Recognized standards of good practice" are outlined in various industry publications such as are issued by American Concrete Institute, AASHTO, or California Department of Transportation.

The cementitious material content of minor concrete shall conform to the provisions in Section 90-1.01, "Description."

The amount of water used shall result in a consistency of concrete conforming to the provisions in Section 90-6.06, "Amount of Water and Penetration." Additional mixing water shall not be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer.

Discharge of ready-mixed concrete from the transporting vehicle shall be made while the concrete is still plastic and before any stiffening occurs. An elapsed time of 1.5 hours (one hour in non-agitating hauling equipment), or more than 250 revolutions of the drum or blades, after the introduction of the cementitious material to the aggregates, or a temperature of concrete of more than 32° C. will be considered as conditions contributing to the quick stiffening of concrete. The Contractor shall take whatever action is necessary to eliminate quick stiffening, except that the addition of water will not be permitted.

The required mixing time in stationary mixers shall be not less than 50 seconds nor more than 5 minutes.

The minimum required revolutions at mixing speed for transit-mixed concrete shall be not less than that recommended by the mixer manufacturer, and shall be increased, if necessary, to produce thoroughly and uniformly mixed concrete.

Each load of ready-mixed concrete shall be accompanied by a weight certificate which shall be delivered to the Engineer at the discharge location of the concrete, unless otherwise directed by the Engineer. The weight certificate shall be clearly marked with the date and time of day when the load left the batching plant and, if hauled in truck mixers or agitators, the time the mixing cycle started.

A Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished to the Engineer, prior to placing minor concrete from a source not previously used on the contract, stating that minor concrete to be furnished meets all contract requirements, including minimum cementitious material content specified.

The third and fourth paragraphs in Section 90-11.02, "Payment," of the Standard Specifications are amended to read:

Should the Engineer order the Contractor to incorporate any admixtures in the concrete when their use is not required by these specifications or the special provisions, furnishing the admixtures and adding them to the concrete will be paid for as extra work as provided in Section 4-1.03D.

Should the Contractor use admixtures as permitted under Sections 90-4.05, "Optional Use of Chemical Admixtures;" or 90-4.07, "Optional Use of Air-entraining Admixtures;" or should the Contractor request and obtain permission to use other admixtures for the Contractor's benefit, the Contractor shall furnish those admixtures and incorporate them in the concrete at the Contractor's expense and no additional compensation will be allowed therefor.

SECTION 8-3. WELDING

8-3.01 WELDING ELECTRODES

Flux core welding electrodes conforming to the requirements of AWS A5.20 E6XT-4 or E7XT-4 shall not be used to perform any type of welding for this project.

SECTION 9. (BLANK)

SECTION 10. CONSTRUCTION DETAILS

SECTION 10-1. GENERAL

10-1.00 CONSTRUCTION PROJECT INFORMATION SIGNS

Before any major physical construction work readily visible to highway users is started on this contract, the Contractor shall furnish and erect 2 Type 2 Construction Project Information signs at the locations designated by the Engineer.

The signs and overlays shall be of a type and material consistent with the estimated time of completion of the project and shall conform to the details shown on the plans.

The sign letters, border and Caltrans construction logos shall conform to the colors (non-reflective) and details shown on the plans, and shall be on a white background (non-reflective). The colors blue and orange shall conform to PR Color Number 3 and Number 6, respectively, as specified in the Federal Highway Administration's Color Tolerance Chart.

The sign message to be used for fund types shall consist of the following, in the order shown:

**FEDERAL HIGHWAY TRUST FUNDS
STATE HIGHWAY FUNDS**

The sign message to be used for type of work shall consist of the following:

ROADSIDE WORK

The sign message to be used for the Year of Completion of Project Construction will be furnished by the Engineer. The Contractor shall furnish and install the "Year" sign overlay within 10 working days of notification of the year date to be used.

The letter sizes to be used shall be as shown on the plans. The information shown on the signs shall be limited to that shown on the plans.

The signs shall be kept clean and in good repair by the Contractor.

Upon completion of the work, the signs shall be removed and disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Full compensation for furnishing, erecting, maintaining, and removing and disposing of the construction project information signs shall be considered as included in the contract lump sum price paid for construction area signs and no additional compensation will be allowed therefor.

10-1.01 ORDER OF WORK

Order of work shall conform to the provisions in Section 5-1.05, "Order of Work," of the Standard Specifications and these special provisions.

The Contractor shall furnish the Engineer with a statement from the vendor that the order for the plants required for this contract, including inspection plants, has been received and accepted by the vendor. The statement shall be furnished within 30 days after the contract has been approved. The statement from the vendor shall also include the names, sizes, and quantities of plants ordered and the anticipated date of delivery.

The Contractor shall place orders for replacement plants at the appropriate time with the vendor so that roots of the replacement plants are not in a root-bound condition.

Attention is directed to Section 9-1.06, "Partial Payments," of the Standard Specifications. For progress payment purposes, the Department will retain 50 percent of the estimated value of highway planting work done until a statement from the vendor that the order for the plants required for this contract has been submitted to the Engineer.

The Contractor shall furnish the Engineer with a statement from the vendor that the order for the seed required for this contract has been received and accepted by the vendor. The statement shall be furnished not less than 60 days prior to applying seeds. The statement from the vendor shall also include the names and quantity of seed ordered and the anticipated date of delivery.

Attention is directed to the requirements specified under "Wild Flower Seeding" elsewhere in these special provisions, regarding time restrictions for planting operations and seed application.

Attention is directed to the requirements specified under "Irrigation Systems Functional Test" elsewhere in these special provisions, regarding restrictions for planting operations.

Attention is directed to the requirements specified under "Locate Existing Water Line Crossovers and Conduits" elsewhere in these special provisions, regarding the locating of existing irrigation facilities.

Unless otherwise shown on the plans or specified in these special provisions, conduits to be installed by open trench for water line crossovers and sprinkler control crossovers shall be installed prior to the installation of other pipe supply lines.

Attention is directed to the requirements specified in Section 20-5.027B, "Wiring Plans and Diagrams," of the Standard Specifications, regarding submittal of working drawings.

10-1.02 WATER POLLUTION CONTROL

Water pollution control work shall conform to the requirements in Section 7-1.01G, "Water Pollution," of the Standard Specifications and these special provisions.

This project shall conform to the requirements of General Construction Activity Storm Water Permit No. CAS00000 issued by the State Water Resources Control Board. This General Permit, hereafter referred to as the "Permit," regulates storm water discharges associated with construction activities.

Water pollution control work shall conform to the requirements in the Construction Contractor's Guide and Specifications of the Caltrans Storm Water Quality Handbooks, dated April 1997, and addenda thereto issued up to, and including, the date of advertisement of the project, hereafter referred to as the "Handbook". Copies of the Handbook and the General Permit may be obtained from the Department of Transportation, Material Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520.

Copies of the Handbook and the Permit are also available for review at the Department of Transportation, District 8, 464 West Fourth Street, San Bernardino, CA 92401-1400.

The Contractor shall become fully informed of and comply with the applicable provisions of the Handbook, Permit and Federal, State and local regulations that govern the Contractor's operations and storm water discharges from both the project site and areas of disturbance outside the project limits during construction. The Contractor shall maintain a copy of the Permit at the project site and shall make the Permit available during construction activities.

Unless arrangements for disturbance of areas outside the project limits are made by the Department and made part of the contract, it is expressly agreed that the Department assumes no responsibility to the Contractor or property owner whatsoever with respect to any arrangements made between the Contractor and property owner to allow disturbance of areas outside the project limits.

The Contractor shall be responsible for the costs and for any liability imposed by law as a result of the Contractor's failure to comply with the requirements set forth in this section "Water Pollution Control", including but not limited to, compliance with the applicable provisions of the Handbook, Permit and Federal, State and local regulations. For the purposes of this paragraph, costs and liabilities include, but are not limited to, fines, penalties and damages whether assessed against the State or the Contractor, including those levied under the Federal Clean Water Act and the State Porter Cologne Water Quality Act.

In addition to any remedy authorized by law, so much of the money due the Contractor under the contract that shall be considered necessary by the Department may be retained by the State of California until disposition has been made of the costs and liabilities.

The retention of money due the Contractor shall be subject to the following:

1. The Department will give the Contractor 30 days notice of its intention to retain funds from any partial payment which may become due to the Contractor prior to acceptance of the contract. Retention of funds from any payment made after acceptance of the contract may be made without prior notice to the Contractor.
2. No retention of additional amounts out of partial payments will be made if the amount to be retained does not exceed the amount being withheld from partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications.
3. If the Department has retained funds and it is subsequently determined that the State is not subject to the costs and liabilities in connection with the matter for which the retention was made, the Department shall be liable for interest on the amount retained at the legal rate of interest for the period of the retention.

Conformance with the requirements of this section "Water Pollution Control" shall not relieve the Contractor from the Contractor's responsibilities, as provided in Sections 7-1.11, "Preservation of Property," 7-1.121, "Indemnification," and 7-1.122, "Insurance," of the Standard Specifications.

The Contractor shall, at reasonable times, allow authorized agents of the California Regional Water Quality Control Board, State Water Resources Control Board, U. S. Environmental Protection Agency and local storm water management agency, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the construction site and the Contractor's facilities pertinent to the work;
2. Have access to and copy any records that must be kept as specified in the Permit;
3. Inspect the construction site and related soil stabilization practices and sediment control measures; and
4. Sample or monitor for the purpose of ensuring compliance with the Permit.

The Contractor shall notify the Engineer immediately upon request from regulatory agencies to enter, inspect, sample, monitor or otherwise access the project site or the Contractor's records.

STORM WATER POLLUTION PREVENTION PLAN PREPARATION, APPROVAL AND UPDATES

As part of the water pollution control work, a Storm Water Pollution Prevention Plan, hereafter referred to as the "SWPPP," is required for this contract. The SWPPP shall conform to the requirements in Section 7-1.01G, "Water Pollution," of the Standard Specifications, the requirements in the Handbook, the requirements of the Permit and these special provisions. Upon the Engineer's approval of the SWPPP, the SWPPP shall be deemed to fulfill the requirements of Section 7-1.01G, "Water Pollution," of the Standard Specifications for development and submittal of a Water Pollution Control Program.

No work having potential to cause water pollution, as determined by the Engineer, shall be performed until the SWPPP has been approved by the Engineer.

Within 30 days after the approval of the contract, the Contractor shall submit 3 copies of the SWPPP to the Engineer. The Contractor shall allow 15 days for the Engineer to review the SWPPP. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the SWPPP within 15 days of receipt of the Engineer's comments and shall allow 15 days for the Engineer to review the revisions. Upon the Engineer's approval of the SWPPP, 3 additional copies of the SWPPP, incorporating the required changes, shall be submitted to the Engineer. In order to allow construction activities to proceed, the Engineer may conditionally approve the SWPPP while minor revisions are being completed.

The objectives of the SWPPP shall be to identify pollution sources that may adversely affect the quality of storm water discharges associated with the project and to identify, construct, implement and maintain water pollution control measures, hereafter referred to as control measures, to reduce to the extent feasible pollutants in storm water discharges from the construction site both during and after construction is completed under this contract.

The SWPPP shall incorporate control measures in the following categories:

1. Soil stabilization practices;
2. Sediment control practices;
3. Sediment tracking control practices;
4. Wind erosion control practices; and
5. Non-storm water management and waste management and disposal control practices.

Specific objectives and minimum requirements for each category of control measures are contained in the Handbook.

The Contractor shall consider the objectives and minimum requirements presented in the Handbook for each of the above categories. When minimum requirements are listed for any category, the Contractor shall incorporate into the SWPPP and implement on the project, one or more of the listed minimum controls required in order to meet the pollution control objectives for the category. In addition, the Contractor shall consider other control measures presented in the Handbook and shall incorporate into the SWPPP and implement on the project the control measures necessary to meet the objectives of the SWPPP. The Contractor shall document the selection process in accordance with the procedure specified in the Handbook.

The SWPPP shall include, but not be limited to, the following items as described in the Handbook and Permit:

1. Source Identification;
2. Erosion and Sediment Controls;
3. Non-Storm Water Management;
4. Waste Management and Disposal;
5. Maintenance, Inspection and Repair;
6. Training;
7. List of Contractors and Subcontractors;
8. Post-Construction Storm Water Management;
9. Preparer;
10. A copy of the Notice of Intent (NOI) submitted by the Department for this project;
11. Copy of the General Permit;
12. BMP Consideration Checklist;
13. SWPPP Checklist;
14. Schedule of Values; and
15. Water Pollution Control Drawings.

The Contractor shall amend the SWPPP, graphically and in narrative form, whenever there is a change in construction activities or operations which may affect the discharge of significant quantities of pollutants to surface waters, ground waters, municipal storm drain systems, or when deemed necessary by the Engineer. The SWPPP shall also be amended if it is in violation of any condition of the Permit, or has not effectively achieved the objective of reducing pollutants in storm water discharges. Amendments shall show additional control measures or revised operations, including those in areas not shown in the initially approved SWPPP, which are required on the project to control water pollution effectively. Amendments to the SWPPP shall be submitted for review and approval by the Engineer in the same manner specified for the initially approved SWPPP. Approved amendments shall be dated and logged in the SWPPP. Upon approval of the amendment, the Contractor shall implement the additional control measures or revised operations.

The Contractor shall keep a copy of the SWPPP and approved amendments at the project site. The SWPPP shall be made available upon request of a representative of the Regional Water Quality Control Board, State Water Resources Control Board, U.S. Environmental Protection Agency or local storm water management agency. Requests by the public shall be directed to the Engineer.

By June 15 of each year, the Contractor shall submit an annual certification to the Engineer stating compliance with the requirements governing the Permit. If the project is in non-compliance at any time, the Contractor shall make a written report to the Engineer within 15 days of identification of non-compliance.

SCHEDULE OF VALUES

The Contractor shall submit with the SWPPP, for approval by the Engineer, a schedule of values detailing the cost breakdown of the contract lump sum item for water pollution control. The schedule of values shall reflect the items of work, quantities and costs for control measures shown in the SWPPP, except for critical temporary controls and permanent control measures which are shown on the project plans and for which there is a contract item of work. Adjustments in the items of work and quantities listed in the schedule of values shall be made when required to address approved amendments to the SWPPP.

The sum of the amounts for the units of work listed in the schedule of values shall be equal to the contract lump sum price for water pollution control.

If approved in writing by the Engineer, the schedule of values will be used to determine progress payments for water pollution control during the progress of the work, and as the basis for calculating any adjustment in compensation for the contract item for water pollution control due to changes in the work ordered by the Engineer.

SWPPP IMPLEMENTATION

Upon approval of the SWPPP, the Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting and maintaining the control measures included in the SWPPP and any amendments thereto and for removing and disposing of temporary control measures. Unless otherwise directed by the Engineer or specified in these special provisions, the Contractor's responsibility for SWPPP implementation shall continue throughout any temporary suspension of work ordered in accordance with Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. Requirements for installation, construction, inspection, maintenance, removal and disposal of control measures are specified in the Handbook and these special provisions.

Soil stabilization practices and sediment control measures, including minimum requirements, shall be provided throughout the winter season, defined as between November 15 and April 1.

Implementation of soil stabilization practices and sediment control measures for soil-disturbed areas of the project site shall be completed, except as provided for below, no later than 20 days prior to the beginning of the winter season or upon start of applicable construction activities for projects which begin either during or within 20 days of the winter season.

Throughout the winter season, the active, soil-disturbed area of the project site shall be no more than 2 hectares. The Engineer may approve, on a case-by-case basis, expansions of the active, soil-disturbed area limit. The Contractor shall demonstrate the ability and preparedness to fully deploy soil stabilization practices and sediment control measures to protect soil-disturbed areas of the project site before the onset of precipitation. The Contractor shall maintain a quantity of soil stabilization and sediment control materials on site equal to 100 percent of that sufficient to protect unprotected, soil-disturbed areas on the project site and shall maintain a detailed plan for the mobilization of sufficient labor and equipment to fully deploy control measures required to protect unprotected, soil-disturbed areas on the project site prior to the onset of precipitation. The Contractor shall include a current inventory of control measure materials and the detailed mobilization plan as part of the SWPPP.

Throughout the winter season, soil-disturbed areas of the project site shall be considered to be nonactive whenever soil disturbing activities are expected to be discontinued for a period of 20 or more days and the areas are fully protected. Areas that will become nonactive either during the winter season or within 20 days thereof shall be fully protected with soil stabilization practices and sediment control measures within 10 days of the discontinuance of soil disturbing activities or prior to the onset of precipitation, whichever is first to occur.

Throughout the winter season, active soil-disturbed areas of the project site shall be fully protected at the end of each day with soil stabilization practices and sediment control measures unless fair weather is predicted through the following work day. The weather forecast shall be monitored by the Contractor on a daily basis. The National Weather Service forecast shall be used, or an alternative weather forecast proposed by the Contractor may be used if approved by the Engineer. If precipitation is predicted prior to the end of the following work day, construction scheduling shall be modified, as required, and the Contractor shall deploy functioning control measures prior to the onset of the precipitation.

The Contractor shall implement, year-round and throughout the duration of the project, control measures included in the SWPPP for sediment tracking, wind erosion, non-storm water management and waste management and disposal.

The Engineer may order the suspension of construction operations which create water pollution if the Contractor fails to conform to the requirements of this section "Water Pollution Control" as determined by the Engineer.

MAINTENANCE

To ensure the proper implementation and functioning of control measures, the Contractor shall regularly inspect and maintain the construction site for the control measures identified in the SWPPP. The Contractor shall identify corrective actions and time frames to address any damaged measures or reinitiate any measures that have been discontinued.

The construction site inspection checklist provided in the Handbook shall be used to ensure that the necessary measures are being properly implemented, and to ensure that the control measures are functioning adequately. The Contractor shall submit one copy of each site inspection record to the Engineer.

During the winter season, inspections of the construction site shall be conducted by the Contractor to identify deficient measures, as follows:

1. Prior to a forecast storm;
2. After any precipitation which causes runoff capable of carrying sediment from the construction site;
3. At 24 hour intervals during extended precipitation events; and
4. Routinely, at a minimum of once every 2 weeks.

If the Contractor or the Engineer identifies a deficiency in the deployment or functioning of an identified control measure, the deficiency shall be corrected by the Contractor immediately, or by a later date and time if requested by the Contractor and approved by the Engineer in writing, but not later than the onset of subsequent precipitation events. The correction of deficiencies shall be at no additional cost to the State.

PAYMENT

The contract lump sum price paid for prepare storm water pollution prevention plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in developing, preparing, obtaining approval of, revising and amending the SWPPP as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Attention is directed to Sections 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications. Payments for prepare storm water pollution prevention plan will be made as follows:

1. After the SWPPP has been approved by the Engineer, 75 percent of the contract item price for prepare storm water pollution prevention plan will be included in the monthly partial payment estimate; and
2. After acceptance of the contract pursuant to Section 7-1.17, "Acceptance of Contract," the remaining 25 percent of the contract item price for prepare storm water pollution prevention plan will be made in accordance with Section 9-1.07.

The contract lump sum price paid for water pollution control shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in installing, constructing, maintaining, removing and disposing of control measures, except those shown on the project plans and for which there is a contract item of work, and excluding developing, preparing, obtaining approval of, revising and amending the SWPPP, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Changes in control measures required by an approved amendment to the SWPPP, except changes to those control measures shown on the project plans and for which there is a contract item of work, will be considered extra work, in accordance with Section 4-1.03D of the Standard Specifications and the following:

If the control measure is listed in the approved SWPPP schedule of values, an adjustment in compensation for the contract item for water pollution control will be made by applying the increase or decrease in quantities to the approved schedule of values. No adjustment of compensation will be made to the unit price listed for any item in the schedule of values due to any increase or decrease in the quantities, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," shall not apply to items listed in the schedule of values.

If the control measure is not listed in the approved SWPPP schedule of values, payment will be made by force account.

Those control measures which are shown on the project plans and for which there is a contract item of work will be measured and paid for as that item of work.

The Engineer will retain an amount equal to 25 percent of the estimated value of the contract work performed during estimate periods in which the Contractor fails to conform to the requirements of this section "Water Pollution Control" as determined by the Engineer.

Retentions for failure to conform to the requirements of this section "Water Pollution Control" shall be in addition to the other retentions provided for in the contract. The amounts retained for failure of the Contractor to conform to the requirements of this section will be released for payment on the next monthly estimate for partial payment following the date that an approved SWPPP has been implemented and maintained, and water pollution is adequately controlled, as determined by the Engineer.

10-1.03 PRESERVATION OF PROPERTY

Attention is directed to the provisions in Section 7-1.11, "Preservation of Property," of the Standard Specifications and these special provisions.

Existing trees, shrubs and other plants, that are not to be removed as shown on the plans or specified elsewhere in these special provisions, and are injured or damaged by reason of the Contractor's operations, shall be replaced by the Contractor. The minimum size of tree replacement shall be No. 15 container and the minimum size of shrub replacement shall be No. 15 container. Replacement ground cover plants shall be from flats and shall be planted 300 mm on center. Replacement of Carpobrotus ground cover plants shall be from cuttings and shall be planted 300 mm on center. Replacement planting shall conform to the requirements in Section 20-4.07, "Replacement," of the Standard Specifications.

Damaged or injured plants shall be removed and disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications. At the option of the Contractor, removed trees and shrubs may be reduced to chips. The chipped material shall be spread within the highway right of way at locations designated by the Engineer.

Replacement planting of injured or damaged trees, shrubs and other plants shall be completed prior to the start of the plant establishment period and shall conform to the provisions in Section 20-4.05, "Planting," of the Standard Specifications.

Replacement planting of injured or damaged trees, shrubs and other plants shall be completed not less than 20 working days prior to acceptance of the contract. Replacement plants shall be watered as necessary to maintain the plants in a healthy condition.

10-1.04 DAMAGE REPAIR

Attention is directed to the provisions in Sections 7-1.16, "Contractor's Responsibility for the Work and Materials," and 7-1.165, "Damage by Storm, Flood, Tsunami or Earthquake," of the Standard Specifications and these special provisions.

Damage to slopes or other existing facilities occurring prior to the performance of the work provided for in this contract shall be repaired or reconstructed by the Contractor, as directed by the Engineer. This work will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Storm damage caused by a change in the runoff pattern from that which existed on the day the Notice to Contractors for this project is dated and was the result of work by others within the right of way shall be repaired as directed by the Engineer. The total cost of ordered repair work will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Damage to slopes or other facilities occurring after start of work and before start of plant establishment period shall be repaired or reconstructed by the Contractor as provided in Section 7-1.16 of the Standard Specifications.

Damage to slopes, plants, irrigation systems and other highway facilities occurring as a result of rain during the plant establishment period shall be repaired by the Contractor, when directed by the Engineer. The cost of the repairs which exceed the accumulated sum of \$3,200 will be borne equally by the State and the Contractor. The division of cost will be made by determining the cost of repairs in accordance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications, and paying to the Contractor one-half of the cost which exceeds the sum of \$3,200.

When as a result of freezing conditions (as defined herein) during the plant establishment period, plants have died or, in the opinion of the Engineer, have deteriorated to a point beyond which they will not mature as typical examples of their species, the Engineer may direct replacement of the affected plants. The total cost of ordered plant replacement work will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. A freezing condition, for the purpose of this specification, occurs when the temperature at or near the affected area has been officially recorded below 0°C and plants have been killed or damaged to the degree described above.

When, as a result of drought conditions (as defined herein) during the plant establishment period, plants have died or, in the opinion of the Engineer, have deteriorated to a point beyond which they will not mature as typical examples of their species, the Engineer may direct replacement of the affected plants. The total cost of ordered plant replacements, after water has been restricted or stopped, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Any restriction or shutoff of available water shall not relieve the Contractor from performing other contract work. A drought condition occurs when the Department, or its supplier, restricts or stops delivery of water to the Contractor to the degree that plants have died or deteriorated as described above.

When the provisions in Section 7-1.165, "Damage by Storm, Flood, Tsunami or Earthquake," of the Standard Specifications, are applicable, the provisions above for payment of costs for repair of damage due to rain, freezing conditions and drought shall not apply.

10-1.05 COOPERATION

Attention is directed to Sections 7-1.14, "Cooperation," and 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications and these special provisions.

It is anticipated that work will be in progress by other contractors within or adjacent to the project limits during the duration of the project. Other projects which may be under construction concurrently with this project include but are not limited to:

08-458624 Construction of median barrier.

10-1.06 PROGRESS SCHEDULE

Progress schedules will be required for this contract and shall conform to the provisions in Section 8-1.04, "Progress Schedule," of the Standard Specifications.

10-1.07 OBSTRUCTIONS

Attention is directed to Sections 8-1.10, "Utility and Non-Highway Facilities," and 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

The Contractor's attention is directed to the existence of certain underground facilities that may require special precautions be taken by the Contractor to protect the health, safety and welfare of workers and of the public. Facilities requiring special precautions include, but are not limited to: conductors of petroleum products, oxygen, chlorine, and toxic or flammable gases; natural gas in pipelines greater than 150 mm in diameter or pipelines operating at pressures greater than 415 kPa (gage); underground electric supply system conductors or cables, with potential to ground of more than 300 V, either directly buried or in duct or conduit which do not have concentric grounded or other effectively grounded metal shields or sheaths.

The Contractor shall notify the Engineer and the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include but are not limited to the following:

Notification Center	Telephone Number
Underground Service Alert-Northern California (USA)	1-800-642-2444 1-800-227-2600
Underground Service Alert-Southern California (USA)	1-800-422-4133 1-800-227-2600

If these facilities are not located on the plans in both alignment and elevation, no work shall be performed in the vicinity of the facilities, except as provided herein for conduit to be placed under pavement, until the owner, or the owner's representative, has located the facility by potholing, probing or other means that will locate and identify the facility. Conduit to be installed under pavement in the vicinity of these facilities shall be placed by the trenching method in conformance with the provisions in "Conduit" of these special provisions. If, in the opinion of the Engineer, the Contractor's operations are delayed or interfered with by reason of the utility facilities not being located by the owner or the owner's representative, the State will compensate the Contractor for the delays to the extent provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications, and not otherwise, except as provided in Section 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications.

All excavations required for highway planting where the excavations are being made for plants and/or irrigation lines and appurtenances shall be performed by hand trenching methods without the use of power equipment. Power equipment may be used if it is determined there are no utility facilities in the area of the proposed plantings and installations.

10-1.08 MOBILIZATION

Mobilization shall conform to the provisions in Section 11, "Mobilization," of the Standard Specifications.

10-1.09 CONSTRUCTION AREA SIGNS

Construction area signs shall be furnished, installed, maintained, and removed when no longer required in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

The Contractor shall notify the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to commencing excavation for construction area sign posts. The regional notification centers include but are not limited to the following:

Notification Center	Telephone Number
Underground Service Alert-Northern California (USA)	1-800-642-2444 1-800-227-2600
Underground Service Alert-Southern California (USA)	1-800-422-4133 1-800-227-2600

Excavations required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes.

The second sentence of the third paragraph in Section 12-3.02, "Barricades," of the Standard Specifications is amended to read:

The entire area of orange and white stripes shall be Type I, engineering grade, or Type II, super engineering grade, retroreflective sheeting conforming to the requirements of ASTM Designation: D 4956-95.

The third paragraph in Section 12-3.06A, "Stationary Mounted Signs," of the Standard Specifications is amended to read:

Sign panels for stationary mounted signs shall consist of Type III or Type IV reflective sheeting applied to an aluminum substrate conforming to the requirements in the Department's "Specifications for Reflective Sheeting Aluminum Signs." The type of reflective sheeting, Type III or Type IV, shall be at the Contractor's option and sign substrates fabricated from materials other than aluminum may be used when specified in the special provisions.

Legend and border may be applied by a screening process or by use of pressure sensitive cut-out sheeting. Size and spacing of letters and symbols shall be as depicted on the sign specification sheets published by the Department.

Rectangular signs over 1375 mm measured along the horizontal axis, and diamond-shaped signs 1500 mm and larger shall be framed unless otherwise specified. Frames shall be constructed in conformance with the requirements of the Department's "Framing Details for Sheet Aluminum Signs," Sheets 1 through 4 and Table 1 on Sheet 5.

Copies of the Department's "Specifications for Reflective Sheeting Aluminum Signs," "Framing Details for Sheet Aluminum Signs," and sign specification sheets may be obtained from the Department's Office of Business Management, Materiel Operations Branch, 1900 Royal Oaks Drive, Sacramento, CA 95815.

The second paragraph in Section 12-3.06B, "Portable Signs," of the Standard Specifications is amended to read:

Sign panels for portable signs shall conform to the provisions of sign panels for stationary mounted signs in Section 12-3.06A, "Stationary Mounted Signs," or shall be Type VI reflective sheeting as specified in the special provisions, or shall be cotton drill fabric, flexible industrial nylon fabric, or other approved fabric. Fabric signs shall not be used during the hours of darkness. Size, color, and legend requirements for portable signs shall be as described for stationary mounted sign panels in Section 12-3.06A. The height to the bottom of the sign panel above the edge of traveled way shall be at least 0.3-m.

The third paragraph in Section 12-3.06B, "Portable Signs," of the Standard Specifications is deleted.

Sign substrates for stationary mounted construction area signs may be fabricated from fiberglass reinforced plastic as specified under "Approved Traffic Products" of these special provisions.

Type VI reflective sheeting for sign panels for portable construction area signs shall conform to the provisions in "Approved Traffic Products" of these special provisions.

10-1.10 MAINTAINING TRAFFIC

Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and to the Section entitled "Public Safety" elsewhere in these special provisions, and these special provisions. Nothing in these special provisions shall be construed as relieving the Contractor from the responsibilities specified in Section 7-1.09.

No work that would require a lane closure shall be performed.

Personal vehicles of the Contractor's employees shall not be parked within the right of way except in areas approved by the Engineer

Whenever vehicles or equipment are parked on the shoulder within 1.8 m of a traffic lane or work is actively in progress within 4.8 m of a traffic lane, the shoulder area shall be closed as shown on the plans.

10-1.11 TEMPORARY CRASH CUSHION MODULE

This work shall consist of furnishing, installing and maintaining sand filled temporary crash cushion modules in groupings or arrays at each location shown on the plans, specified in the special provisions or directed by the Engineer. The grouping or array of sand filled modules shall form a complete sand filled temporary crash cushion in accordance with the details shown on the plans and these special provisions.

Attention is directed to "Public Safety" and "Temporary Railing" of these special provisions.

GENERAL

Whenever the work or the Contractor's operations establishes a fixed obstacle, the exposed fixed obstacle shall be protected with a sand filled temporary crash cushion. The sand filled temporary crash cushion shall be in place prior to opening the lanes adjacent to the fixed obstacle to public traffic.

Sand filled temporary crash cushions shall be maintained in place at each location, including times when work is not actively in progress. Sand filled temporary crash cushions may be removed during a work period for access to the work provided that the exposed fixed obstacle is 4.6 m or more from a lane carrying public traffic and the temporary crash cushion is reset to protect the obstacle prior to the end of the work period in which the fixed obstacle was exposed. When no longer required, as determined by the Engineer, sand filled temporary crash cushions shall be removed from the site of the work.

MATERIALS

At the Contractor's option, the modules for use in sand filled temporary crash cushions shall be either Energite III Inertial Modules, Fitch Inertial Modules manufactured after March 31, 1997, or equal:

Energite III Inertial Modules manufactured by Energy Absorption Systems, Inc., One East Wacker Drive, Chicago, IL 60601-2076, Telephone 1-312-467-6750, FAX 1-800-770-6755.

Distributor (Northern): Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, Telephone 1-800-884-8274, FAX 1-916-387-9734

Distributor (Southern): Traffic Control Service, Inc., 1881 Betmor Lane, Anaheim, CA 92805, Telephone 1-800-222-8274, FAX 1-714-937-1070.

Fitch Inertial Modules, national distributor; Roadway Safety Service, Inc., 1050 North Rand Road, Wauconda, IL 60084, Telephone 1-800-426-0839, FAX 1-847-487-9820.

Distributor: Singletree Sales Company, 1533 Berger Drive, San Jose, CA 95112, Telephone 1-800-822-7735, FAX 1-408-287-1929.

Modules contained in each temporary crash cushion shall be of the same type at each location. The color of the modules shall be the standard yellow color as furnished by the vendor, with black lids. The modules shall exhibit good workmanship free from structural flaws and objectionable surface defects. The modules need not be new. Good used undamaged modules conforming to color and quality of the types specified above may be utilized. If used Fitch modules requiring a seal are furnished, the top edge of the seal shall be securely fastened to the wall of the module by a continuous strip of heavy duty tape.

Modules shall be filled with sand in accordance with the manufacturer's directions, and to the sand capacity in kilograms for each module as shown on the plans. Sand for filling the modules shall be clean washed concrete sand of commercial quality. At the time of placing in the modules, the sand shall contain not more than 7 percent water, as determined by California Test 226.

Modules damaged due to the Contractor's operations shall be repaired immediately by the Contractor at the Contractor's expense. Modules damaged beyond repair, as determined by the Engineer, due to the Contractor's operations shall be removed and replaced by the Contractor at the Contractor's expense.

INSTALLATION

Temporary crash cushion modules shall be placed on movable pallets or frames conforming to the dimensions shown on the plans. The pallets or frames shall provide a full bearing base beneath the modules. The modules and supporting pallets or frames shall not be moved by sliding or skidding along the pavement or bridge deck.

A Type R or P marker panel shall be attached to the front of the crash cushion as shown on the plans, when the closest point of crash cushion array is within 3.6 m of the traveled way. The marker panel, when required, shall be firmly fastened to the crash cushion with commercial quality hardware or by other methods approved by the Engineer.

At the completion of the project, temporary crash cushion modules, sand filling, pallets or frames, and marker panels shall become the property of the Contractor and shall be removed from the site of the work. Temporary crash cushion modules shall not be installed in permanent work.

MEASUREMENT AND PAYMENT

Temporary crash cushion modules placed in accordance with the provisions in "Public Safety" elsewhere in these special provisions will not be measured nor paid for.

10-1.12 ROCK BLANKET

Rock blanket shall be placed at the locations shown on the plans and in accordance with these special provisions.

MATERIALS.—Rock for the rock blanket shall be clean, smooth rock obtained from a single source and shall be approved for use by the Engineer.

Rock for the rock blanket shall conform to the following grading:

Screen Size (Millimeters)	Percentage Passing (By Mass)
300x300	100
200x200	0

SITE PREPARATION.—Prior to placing rock on areas to receive rock blankets, the areas shall be cleared as specified under "Roadside Clearing" elsewhere in these special provisions.

After clearing, the areas to receive rock blanket shall be excavated and graded to a smooth, uniform surface and compacted to 90 percent relative compaction. Excess material shall be spread at adjacent locations as directed by the Engineer. After compaction, the areas shall be treated with dichlobenil. The treatment shall be applied at the maximum label rate unless otherwise directed by the Engineer and shall not be applied more than 300 mm beyond the rock blanket limits.

Concrete base used for rock blanket shall be a wet mix and shall conform to Section 90, "Portland Cement Concrete," of the Standard Specifications. A 10 mm pea gravel maximum graded aggregate shall be used. The rock shall be placed in concrete while in a workable state. Excess concrete shall be removed from the face of the rock.

Rock blanket shall be secured in place with dry applied mortar in conjunction with 25 mm by 150 mm redwood dividers fastened with 40 mm by 300 mm stake anchors. Dividers will not be required at locations where rock blanket borders the adjacent edge of pavement. Immediately prior to the application of mortar, rock blanket areas shall be saturated with water.

Mortar used for the rock blanket shall be thoroughly mixed and shall be three parts sand and one part Type II portland cement. The mortar shall be dry-applied in such a way that the rock is secure in place. Any rock which loosens after installation shall be reset at the Contractor's expense by methods approved by the Engineer. Water shall be lightly applied to the mortared areas to ensure hydration. Excess mortar shall be removed from the exposed face of the rock blanket. Rock blanket shall be watered 3 times per day for a period of 3 days following initial mortar setting.

Soil treatment shall conform to the provisions in Section 20-4.026, "Pesticides," of the Standard.

MEASUREMENT AND PAYMENT.—Rock blanket measured by the square meter as determined from actual measurements made parallel to the ground slope.

The contract price paid per square meter for rock blanket shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing rock blanket, complete in place, including grading, removing and spreading excavated soil and compacting the areas to receive the rock blanket, placing concrete base and furnishing and applying redwood dividers and stakes, soil treatment and mortar, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.13 DECOMPOSED GRANITE

Decomposed granite shall be placed in two 40 mm layers as shown on the plans and as specified in these special provisions.

Decomposed granite shall include crushed quartzite rock and shall match graphite gray from Southwest Boulder and stone in color, no more than 6.5 mm in particle size, shall be obtained from a single source and shall be approved by the Engineer.

Prior to placing the decomposed granite, the areas to receive the decomposed granite shall be cleared as specified under "Roadside Clearing" elsewhere in these special provisions.

After clearing, the areas to receive decomposed granite shall be graded to a smooth surface, compacted to 90 percent relative compaction then scarified to a depth of 80 mm. After scarification, the areas shall be treated with dichlobenil. The treatment shall be applied at the maximum label rate unless directed by the Engineer and shall not be applied more than 300 mm beyond the decomposed granite limits.

Soil treatment shall conform to the provisions in Section 20-4.026, "Pesticides," of the Standard Specifications.

A liquid surface hardener consisting of an acrylic and vinyl acetate polymer, shall be used in the various applications of decomposed granite installation to harden surface areas and limit water penetration. The liquid surface hardener shall be a soluble solution mixed with water and applied as recommended by the manufacturer. The hardener shall not impair the aesthetic character of decomposed granite coloring and shall be approved for use by the Engineer.

After soil treatment is complete, liquid surface hardener shall be completed within each area of work during the same working day and shall conform to the manufacturer's recommendations.

Care shall be taken to prevent any overspray of liquid surface hardener onto adjacent rock blanket areas.

Appropriate nozzle size shall be selected to avoid liquid surface hardener runoff during each application.

Edgings will not be required between the decomposed granite areas and the adjacent edge of pavement or rock blanket.

Decomposed granite will be measured by the square meter as determined from actual measurements made parallel to the ground slope.

The contract price paid per square meter for decomposed granite shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing decomposed granite, complete in place, including soil treatment and liquid surface hardener, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.14 EXTEND IRRIGATION CROSSOVERS

Extend existing irrigation crossovers shall conform to the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications and these special provisions.

Extend irrigation crossovers shall include extensions and locating existing irrigation conduit. The sizes of conduit extensions shall be as shown on the plans.

Before any work is started in an area where an existing irrigation crossover conduit is to be extended, the existing conduit shall be located by the Contractor. When exploratory holes are used to locate the existing conduit, the exploratory holes shall be excavated in accordance with the provisions in Section 20-5.03B, "Conduit for Water Line Crossovers and Sprinkler Control Crossovers," of the Standard Specifications.

If debris is encountered in the ends of conduits to be extended, the debris shall be removed prior to extending conduits. Removal of debris within the first meter in the conduits shall be at the Contractor's expense. If debris is encountered in the conduit more than one meter from the ends of the conduits to be extended, the additional debris shall be removed as directed by the Engineer. When directed by the Engineer, removal of debris more than one meter from the ends in the conduits will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Conduit extensions shall be corrugated steel pipe.

Sprinkler control crossover extensions shall be Type 1 or Type 3 electrical conduit.

Full compensation for locating, excavation and backfill, of conduits for extend irrigation crossovers shall be considered as included in the contract price paid per meter extend 250 mm corrugated steel pipe conduit (1.63 mm thick) and no additional compensation will be allowed therefor.

SECTION 10-2. HIGHWAY PLANTING AND IRRIGATION SYSTEMS

10-2.01 GENERAL

The work performed in connection with highway planting and irrigation systems shall conform to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications and these special provisions.

PROGRESS INSPECTIONS.--Progress inspections will be performed by the Engineer for completed highway planting and irrigation system work at designated stages during the life of the contract.

Progress inspections will not relieve the Contractor of his responsibility for installation in accordance with the special provisions, plans and Standard Specifications. Work within an area shall not progress beyond each stage until the inspection has been completed; corrective work has been performed; and the work is approved, unless otherwise permitted by the Engineer.

The requirements for progress inspections will not preclude additional inspections of work by the Engineer at any time during the life of the contract.

The Contractor shall notify the Engineer in writing, at least 4 working days prior to completion of the work for each stage of an area and shall allow a minimum of 3 working days for the inspection.

Progress inspections will be performed at the following stages of work:

PRESSURE TESTING OF PIPELINES.--During pressure testing of the pipelines on supply side of control valves.

TESTING OF CONDUCTORS.--During testing of low voltage conductors.

PREPARING PLANTING AREAS.--Before planting begins and after completion of the work specified for planting in Section 20-4.03, "Preparing Planting Areas," of the Standard Specifications.

PLANTING.--Before plant establishment work begins and after completion of the work specified for planting in Section 20-4.05, "Planting," of the Standard Specifications.

PLANT ESTABLISHMENT WORK.--At intervals of one month during the plant establishment period.

10-2.02 (BLANK)

10-2.03 EXISTING HIGHWAY IRRIGATION FACILITIES

In addition to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications, the work performed in connection with the various existing highway irrigation system facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Existing irrigation facilities shown on the plans or specified in these special provisions to be removed, shall remain in place until their use, as determined by the Engineer, is no longer required.

Existing irrigation facilities that are to remain, or are to be maintained as part of this contract, shall be protected from damage. If the Contractor's operations damage the existing irrigation facilities, the Contractor shall, at the Contractor's expense, repair or replace the damaged facilities as follows:

Repair or replacement of damaged facilities shall be completed within 10 working days of the damage.

Replaced irrigation facilities shall be new, and of equal or better quality than the damaged facility. Replacement irrigation facilities shall be compatible with the irrigation systems to remain.

After repair or replacement of the facilities is complete, the Contractor shall demonstrate to the Engineer that the repaired or replaced facilities operate properly.

10-2.03A REMOVE EXISTING IRRIGATION FACILITIES

Existing irrigation facilities not shown on the plan or not specified in these special provisions will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Existing irrigation facilities to be removed, shall be removed and disposed of, except for facilities that are more than 150 mm below finished grade may be abandoned in place. Removed facilities shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Immediately after disconnecting an existing irrigation facility to be removed or abandoned from an existing facility to remain, the remaining facility shall be capped or plugged, or shall be connected to a new or existing irrigation facility.

Existing pipe supply lines and control and neutral conductors, that are within existing irrigation crossovers to be used, shall be removed and disposed of.

10-2.04 HIGHWAY PLANTING

The work performed in connection with highway planting shall conform to the provisions in Section 20-4, "Highway Planting," of the Standard Specifications and these special provisions.

10-2.04A HIGHWAY PLANTING MATERIALS

PLANTS

Plants that are found to be in a root bound condition or have an underdeveloped root ball as determined by the Engineer will not be accepted.

MULCH (GREEN MATERIAL)

Mulch shall be woody material. Woody materials shall consist of chipped, shredded or ground green materials such as shrubs, tree trimmings or clean processed wood products.

Deleterious materials such as rocks, glass, plastics, metals, clods, weeds, weed seeds, coarse objects, grass clippings, manure waste, sticks larger than the specified particle size, salts, paint, petroleum products, pesticides or other chemical residues that would be harmful to plant or animal life shall not exceed 0.1 percent of the mulch volume. Chipping shall include shredding, grinding or any other method used to reduce mulch materials to the specified size. At least 85 percent of the mulch, by volume, shall conform to the particle size specified.

Mulch shall also conform to the following:

The particle size and quality shall conform to the requirements for shredded bark in Section 20-2.08, "Mulch," of the Standard Specifications.

COMMERCIAL FERTILIZER

Commercial fertilizer used during planting shall be a granular form and shall have the following guaranteed chemical analysis:

Ingredient	Percentage
Nitrogen	6
Phosphoric Acid	20
Water Soluble Potash	20

Commercial fertilizer (granular) used during plant establishment shall be a granular form and shall have the following guaranteed chemical analysis:

Ingredient	Percentage
Nitrogen	9
Phosphoric Acid	9
Water Soluble Potash	9

10-2.04B ROADSIDE CLEARING

Prior to preparing planting areas and wild flower seeding areas, or commencing irrigation trenching operations for planting areas, trash and debris shall be removed from the entire highway right of way within the project limits, excluding paved areas, medians and existing planted areas where existing plants are to remain or be maintained.

In addition to removing trash and debris, the project area shall be cleared as specified herein:

Weeds shall be killed and removed within proposed hemerocallis hybrids and lantana montevidensis ground cover areas.

Weeds shall be killed within proposed planting areas where plants are to be planted in groups or rows one m or less apart, and from within an area extending one m beyond the outer limits of the groups or rows of plants.

Weeds shall be killed and removed within an area 2 m in diameter centered at each proposed acacia redolens, and at each proposed plant location where the plants are to be planted more than 4.6 m apart and are located outside of proposed ground cover areas.

Weeds shall be killed and removed from within areas where proposed decomposed granite or rock blankets are to be placed. Existing rock in the areas of the proposed decomposed granite or rock blankets shall be relocated to other areas of existing rock as directed by the Engineer. Relocating existing rock will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Areas outside the areas specified for weeds to be killed shall be mowed. Limits of mowing shall extend from the weeds to be killed areas out to the adjacent edges of shoulders, dikes, curbs, sidewalks, fences and as otherwise indicated on the plans. A 1.5 m wide area may be mowed for installation of irrigation components in the areas otherwise identified not to be mowed on the plans

Roadside clearing for wild flower seeding areas shall consist of mowing weeds and removing trash and debris in the areas to be seeded until the start of the wild flower seeding operation.

After the initial roadside clearing is complete, additional roadside clearing work shall be performed as often as necessary to maintain the areas, as specified above, in a neat appearance until the start of the plant establishment period. This work shall include the following:

Trash and debris shall be removed.

Rodents shall be controlled.

Weed growth shall be killed before the weeds reach the seed stage of growth or exceed 100 mm in length, except for weeds in wild flower seeding areas.

Weeds in plant basins, including basin walls, shall be removed by hand pulling, after the plants have been planted.

Areas outside the areas specified to be cleared of weeds shall be mowed.

WEED CONTROL.--Weed control shall also conform to the following:

Stolon type weeds shall be killed with glyphosate.

Tumbleweeds shall be removed by hand pulling before the tumbleweeds reach a height of 150 mm.

Removed weeds shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

At the option of the Contractor, weed growth in mowed areas may be controlled by growth regulators. Growth regulators shall be applied before weeds exceed 300 mm in height.

Areas to be mowed shall be mowed when weed height exceeds 300 mm. Weeds shall be mowed to a height of 40 mm to 75 mm.

Disposal of mowed material and killed weeds after initial roadside clearing will not be required, unless otherwise directed by the Engineer. When directed by the Engineer, mowed material and killed weeds shall be disposed of and the disposal will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

10-2.04C PESTICIDES

Pesticides used to control weeds shall conform to the provisions in Section 20-4.026, "Pesticides," of the Standard Specifications except that photosensitive dye will not be required where pesticides are applied to areas to receive mulch. Except as otherwise provided in these special provisions, pesticide use shall be limited to the following materials:

Cacodylic Acid
Diquat
Fluazifop-butyl
Glyphosate
Isoxaben
Sethoxydim
Oxadiazon - 50 percent WP (Preemergent)
Oryzalin (Preemergent)
Pendimethalin (Preemergent)
Trifluralin (Preemergent)
Melfluidide (Growth regulator)
Napropamide

Oxadiazon or shall be applied in a separate application from the mulch and shall only be applied to areas that are to be covered by mulch on that day.

Glyphosate shall be used to kill stolon type weeds.

Oxadiazon shall be of the emulsifiable concentration or wettable powder type.

Ground cover plants shall be planted a minimum of 5 days and shall be watered prior to the application of preemergents.

A minimum of 100 days shall elapse between applications of preemergents.

Except for ground cover plants, preemergents shall not be applied within 450 mm of plants or within wild flower seeding areas.

Growth regulators shall not be applied within 2 m of trees, shrubs or vines.

No pesticides shall be applied within the limits of plant basins. Pesticides shall not be applied in such a manner as to allow the pesticides to come in contact with the foliage and woody parts of proposed plants.

10-2.04D PREPARING PLANTING AREAS

Plants adjacent to drainage ditches shall be located so that after construction of the basins, no portion of the basin walls shall be less than the minimum distance shown on the plans for each plant involved.

PREPARE HOLES.—Holes for plants shall be excavated to the minimum dimensions shown on the plans.

Root protectors shall be installed in plant holes in accordance with the details shown on the plans and the requirements specified under "Root Protectors" elsewhere in these special provisions.

Full compensation for preparing holes shall be considered as included in the contract unit prices paid for the plants involved and no separate payment will be made therefor.

10-2.04E PLANTING

Commercial fertilizer shall be applied or placed at the time of planting and at the rates shown on the plans.

Commercial fertilizer (granular) shall be mixed into the plant hole soil a minimum depth of 50 mm near the root ball of Plant (Group A, B, U) plants.

Mulch placed in areas outside of plant basins shall be spread to a depth of not less than 25 mm.

Mulch for plant basins shall be placed so that the mulch does not come in contact with the plant stem.

Mulch placed adjacent to earthen drainage ditches shall not be placed within one meter of the center line of the ditches. Mulch placed adjacent to paved drainage ditches shall not be placed within one meter of its edge.

Attention is directed to the requirements specified under "Irrigation Systems Functional Test" elsewhere in these special provisions regarding functional tests of irrigation systems. Planting shall not be performed in an area until the functional test has been completed on the irrigation system serving that area.

Full compensation for furnishing and applying commercial fertilizer (granular) and mulch within plant basins shall be considered as included in the contract unit prices paid for the various items of plants involved and no separate payment will be made therefor.

ROOT PROTECTORS.--Root protectors shall be installed at the time the plant holes are prepared in accordance with the details shown on the plans and these special provisions.

Root protectors shall be fabricated from 25 mm, hexagonal pattern, 20-gage, mesh wire. The wire edge at the top of the cylinder shall be uncut (manufactured finished edge) and shall be free of sharp points. Galvanized mesh wire shall be treated in a chemical solution that will remove the galvanized material prior to installation.

Root protectors shall be of a closed bottom design, and shall be of the height and diameter that there will be a minimum of 150 mm of clearance between the root ball and the sides and bottom of the wire cylinder.

Root protectors shall be placed in plant holes with approximately 75 mm of the wire cylinder extending above finished grade.

Quantities of root protectors to be paid for will be measured by the unit determined from actual count in place.

The contract unit price paid for root protectors shall include full compensation for furnishing all labor, materials, tools equipment, and incidentals, and for doing all the work involved in root protectors, complete in place, including installation, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-2.04F WILD FLOWER SEEDING

Wild flower seeding shall conform to the provisions in Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Wild flower seeding work shall consist of mowing weeds, scarifying the soil, furnishing and dry applying native wild flower seed to areas designated on the plans as "Wild Flower Seeding."

Wild flower seeding materials shall not be applied prior to October 1, nor after February 1. If wild flower seeding work cannot be performed prior to the start of plant establishment and within the above specified time limit, then the work shall be performed during the plant establishment period when directed by the Engineer.

Pesticides shall not be used on wild flower seeding areas after the seed has been applied.

SITE PREPARATION.—Following roadside clearing and just prior to seed application, wild flower seeding areas shall be scarified to a minimum depth of 25 mm.

Removed trash and debris shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

MATERIALS.—Materials shall conform to the provisions in Section 20-2, "Materials," of the Standard Specifications and the following:

SEED.—Seed shall conform to the provisions in Section 20-2.10, "Seed," of the Standard Specifications. Individual seed species shall be measured and mixed in the presence of the Engineer.

Seed not required to be labeled under the California Food and Agricultural Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts, or a seed technologist certified by the Society of Commercial Seed Technologists.

Seed shall have been tested for purity and germination not more than one year prior to application of seed.

Results from testing seed for purity and germination shall be furnished to the Engineer prior to applying seed.

NON-LEGUME SEED.—Non-legume seed shall consist of the following:

NON-LEGUME SEED		
Botanical Name (Common Name)	Percent Germination (Minimum)	Kilograms pure live seed per hectare (Slope measurement)
Eschscholzia californica (California Poppy)	75	3.30
Clarkia amoena (Farewell to Spring)	85	1.10
Penstemon spectabilis (Showy Penstemon)	75	0.75

Seed shall be delivered to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag will not be accepted.

A sample of approximately 30 g of seed will be taken from each seed container by the Engineer.

APPLICATION.—Wild flower seed shall be applied at the rate of 525 g per 1000 square meters (slope measurement).

Seed shall be incorporated into the soil to a maximum depth of 6 mm by raking, dragging or drilling.

Watering of wild flower seeding areas will not be required unless directed by the Engineer. When directed by the Engineer, the watering will be paid for by extra work as provided in Section 4-1.03D of the Standard Specifications.

MEASUREMENT AND PAYMENT.—Quantity of Wild flower to be paid for will be measured by the square meter as determined from actual measurements made parallel to the ground slope.

The contract price paid per square meter for wild flower seeding shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in wild flower seeding, complete in place, including trash and debris removal, mowing of weeds, and scarification, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-2.04G PLANT ESTABLISHMENT WORK

The plant establishment period shall be Type 1 and shall be 750 working days.

If wild flower seeding cannot be performed within the time limits specified under "Wild Flower Seeding" elsewhere in these special provisions, and the Engineer determines that the work except wild flower seeding and plant establishment work has been completed, the Engineer will notify the Contractor in writing of the start of the plant establishment period.

Wild flower seeding not performed prior to the start of the plant establishment period shall be performed during the plant establishment period. The work involved in preparing areas to receive wild flower seeding and applying seed shall be in accordance with the requirements specified under "Roadside Clearing" and "Wild Flower Seeding" elsewhere in these special provisions.

After sowing wild flower seed plant establishment work for wild flower seeding areas will not be required except for trash and debris removal. Wild flower seeding areas shall be mowed when directed by the Engineer, and the mowing will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Nine applications of commercial fertilizer (granular) shall be applied to trees, shrubs, and ground cover areas when directed by the Engineer. Commercial fertilizer shall be applied at the rates shown on the plans and shall be spread with a mechanical spreader wherever possible.

The center to center spacing of replacement plants for unsuitable ground cover plants shall be the original spacing.

During the plant establishment period, the Contractor shall water the plants utilizing the Remote Irrigation Control System (RICS) software program. The Contractor shall submit a watering schedule to the Engineer for use during the plant establishment period.

Weeds shall be killed within an area one meter beyond the outer edges of each plant drip line.

Weeds within rock blanket areas, mulch areas and ground cover areas, but outside of plant basins, shall be controlled by killing.

Weeds outside of individual plant locations, mulch areas, ground cover areas and rock blanket areas shall be controlled by mowing. Limits of mowing shall extend out to the edges of pavement, curbs, dikes, sidewalks, existing planting areas and fences and as otherwise indicated on the plans.

Tumbleweeds shall be removed by hand pulling before the tumbleweeds reach a height of 100 mm.

Areas to be mowed shall be mowed 9 times throughout the plant establishment period when directed by the Engineer. Additional mowing as required by the Engineer will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. When weeds are required to be mowed, weeds shall be mowed to a height of 40 mm to 75 mm.

Weeds to be killed shall be killed when the weeds exceed 100 mm.

Weed control within median areas, pavement, curbs, sidewalk and other existing surfaced areas will not be required.

Except as specified elsewhere in these special provisions, disposal of mowed material will not be required unless ordered by the Engineer. Disposal of mowed material, as directed by the Engineer, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

At the option of the Contractor, a growth regulator may be applied to mowed areas, provided the growth regulator is approved in advance by the Engineer and the growth regulator is applied in accordance with the requirements specified elsewhere in these special provisions. If a growth regulator is approved and applied, the growth regulator shall be at the Contractor's expense.

At the option of the Contractor, plants of a larger container size than those originally specified may be used for replacement plants during the first 125 working days of the plant establishment period. The use of plants of a larger container size than those originally specified for replacement plants shall be at the Contractor's expense.

After 125 working days of the plant establishment period have been completed, replacement of plants, except for ground cover plants, shall be No. one size for seedlings, pot and liner size plants; No. 5 size for No. one size plants; No. 15 size for No. 5 size plants; and No. 15 size for No. 15 size plants.

When ordered by the Engineer, one application of a preemergent pesticide conforming to the requirements specified under "Pesticides" elsewhere in these special provisions, shall be applied between 40 and 50 working days prior to completion of the plant establishment period. This work will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

When the Engineer determines that the plant stakes are inadequate to support the plants during the plant establishment period, the Contractor, at his cost, shall replace the plant stakes with a larger diameter stake adequate to support the plant. Plant stakes shall be removed at any time during the plant establishment period when ordered by the Engineer. Plant stakes shall be completely removed within 15 working days prior to completion of the plant establishment period.

The Contractor shall submit a watering schedule program, for each irrigation controller, to the Engineer for approval not less than 40 working days prior to the completion of the plant establishment period. If the Engineer determines the submitted watering schedule is unacceptable, the Contractor shall submit a revised watering schedule to the Engineer for approval within 5 working days after receiving notice that the previously submitted schedule is unacceptable.

Written instructions shall be given to the Engineer during the plant establishment period on the use and adjustment of the installed irrigation controllers. The approved watering schedule program shall be implemented by the Contractor not less than 10 working days prior to the completion of the plant establishment period. The programming shall not relieve the Contractor of the responsibility to apply sufficient water as conditions may require to keep the plants in a healthy condition.

The final inspection, as specified in Section 5-1.13 of the Standard Specifications, shall be completed a minimum of 20 working days before the estimated completion of the contract.

10-2.05 IRRIGATION SYSTEMS

Irrigation systems shall be furnished and installed in accordance with the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications, except materials containing asbestos fibers shall not be used.

Attention is directed to the requirements specified under "Obstructions" elsewhere in these special provisions, regarding work over or adjacent to existing underground facilities. Excavation for proposed irrigation facilities shall not be started until the existing underground facilities have been located.

Materials for irrigation systems, unless otherwise specified, shall be commercial quality.

Only pipeline trenches and excavation pits for supply lines being supplied from one water service point shall be open at one time. After pressure testing is complete, trenches and pits excavated for pipe supply lines, being supplied from one water service point, shall be backfilled prior to commencing excavations for pipe supply lines being supplied from another water service point.

Primers and paints for application on metal and wood surfaces shall be the best quality grade of the type specified elsewhere in these special provisions and shall be manufactured by a recognized paint manufacturer. Thinners and coloring tints shall conform to the paint manufacturer's recommendations. Coatings shall not be thinned except as recommended by the paint manufacturer for application. Each application of paint shall be compatible with the previous application and shall be from paint made by the same manufacturer. Testing of primers and paints will not be required.

Gate valves, 75 mm and larger in size, shall be furnished with a square lug and shall be operated by use of long shank keys. Prior to acceptance of the contract, 2 long shank keys shall be delivered to the Engineer.

VALVE BOXES.--Valve boxes shall conform to the requirements in Section 20-2.24, "Valve Boxes," of the Standard Specifications, except as otherwise provided herein.

Valve boxes shall be precast portland cement concrete.

Covers for concrete valve boxes shall be cast iron or steel.

Valve boxes shall be identified on the top surface of the covers by labels containing the appropriate abbreviation for the irrigation facility contained in the valve box as shown on the plans. Valve boxes that contain remote control valves shall be identified by the appropriate letters and numbers (controller and station numbers). Labels for valve boxes shall conform to the provisions in Section 20-5.03F, "Valves and Valve Boxes," of the Standard Specifications.

Label material shall be plate plastic.

10-2.05A ELECTRIC AUTOMATIC IRRIGATION COMPONENTS

Attention is directed to the requirements specified in Section 10-3, "Signals, Lighting and Electrical Systems," elsewhere in these special provisions, regarding electrical power for irrigation controllers and irrigation controller enclosure cabinets.

ELECTRIC REMOTE CONTROL VALVES

Electric remote control valves shall conform to the following:

1. Valves shall be of brass, bronze, or cast iron construction.
2. Valves shall be normally closed.
3. Valves shall be completely serviceable from the top without removing the valve body from the system.
4. Valves shall be equipped with a device that will regulate and adjust the flow of water and shall be provided with a manual shutoff.
5. Valves shall be equipped with a manually operated pressure regulating device that can be set to regulate pressure from 138 kPa to 689 kPa.
6. Valves for each irrigation controller shall be the same model series and shall be compatible with the model series of the irrigation controller.
7. Valve solenoids shall operate on the low voltage AC current supplied from the irrigation controller.
8. Valves shall be straight pattern (side inlet) as shown on the plans.
9. Valves shall be provided with manual bleeding devices.
10. Valves shall be equipped with internal diaphragms installed in the valve body casting and shall have stainless steel stems.
11. Valve inlets and outlets shall have threaded fittings.
12. Valves shall be contamination resistant.

PULL BOXES

Pull box installations shall conform to the provisions in Section 20-5.027I, "Conductors, Electrical Conduits and Pull Boxes," of the Standard Specifications.

CONDUCTORS

Low voltage as used in this subsection "Conductors" shall mean 36 V or less. Conductors shall be a minimum number 14 size wire.

Control and neutral conductors shall be used for remote control valve activation and for data communication between each flow sensor and field unit. Low voltage control and neutral conductors in pull boxes and valve boxes, at irrigation controller terminals, and at splices shall be marked as follows:

1. Conductor terminations and splices shall be marked with adhesive backed paper markers or adhesive cloth wrap-around markers, with clear, heat-shrinkable sleeves sealed over the markers.

Markers for the control conductors shall be identified with the appropriate number or letter designations of irrigation controllers and station numbers. Markers for neutral conductors shall be identified with the appropriate number or letter designations of the field units.

The color of low voltage neutral and control conductor insulation shall be homogeneous throughout the entire thickness of the insulation.

Type "C", "S", or "T" splices shall be used. Splices for low voltage control and neutral conductors shall conform to the provisions in sections 86-2.09C, "Connectors and Terminals," 86-2.09D, "Splicing," and 86-2.09E, "Splicing Insulation," of the Standard Specifications except Type "S" splices shall be soldered.

10-2.05B REMOTE IRRIGATION CONTROL SYSTEM

The Remote Irrigation Control System (RICS) shall consist of a base station, field units, digital radio service and manufacturer support and personnel training.

The same manufacturer and model of the equipment and software proposed for this project shall have been in use as a complete and functioning system for a minimum of 3 years by a private sector company or a government agency located in the State of California. The Contractor shall furnish the Engineer with the location and owner (name, address and phone number) of the RICS including approval by its owner for the Engineer to view, inspect and discuss the system and its components.

BASE STATION.--The base station shall consist of communication equipment, an IBM compatible personal computer, printer, software, a work station, and auxiliary items.

The base station shall be installed at the Caltrans' District Maintenance Office, 842 El Sobrante Road, Corona, CA 91719, Telephone (909) 272-0628.

The base station equipment shall conform to the following:

Communication Equipment.--The communication equipment for the base station shall have a 2-way data communications link with the field units by digital radio modem.

The Contractor is responsible for installing the digital radio modem and antenna. The antenna will be located as directed by the manufacturer of the RICS with the approval of the Engineer.

The Contractor shall make application and arrangements for digital radio service and assign the services to the State upon the date of acceptance of the contract.

Digital radio service will be the responsibility of the contractor throughout the life of the contract.

Inputs and outputs of the communication system shall be lightning, transient and surge protected, including the power, antenna and control connections.

Computer.--The computer shall consist of the following:

1. A Pentium III Processor, 600 MHz, minimum.
2. Sixty-four megabytes, minimum, of Random Access Memory (RAM)
3. A 10 gigabyte hard disk drive, minimum.
4. A 90 mm 1.44 megabyte high density floppy diskette drive.
5. A CD-ROM drive, minimum.
6. Four serial ports, minimum.
7. A mouse port and one Microsoft compatible mouse.
8. One parallel port.
9. A high-speed 32-bit Super Video Graphics Array (SVGA) color graphics card with 2 megabyte video memory.
10. A 432 mm SVGA color monitor, non-interlaced at 1024 by 768, with 0.28 dot pitch, minimum.
11. A high speed tape backup drive or removable cartridge disk drive, capable of storing a minimum of 160 megabytes.
12. A 101 key keyboard.
13. A real time battery-backed clock and calendar.
14. A 56K internal radio modem, minimum.
15. An operating system capable of performing multitasking. Multitasking is the ability of the Base Station to run multiple programs simultaneously, i.e., perform other tasks such as word processing or data manipulation while the RICS system functions are performed in the background.
16. All operating systems software, i.e., MS DOS, Microsoft Windows 98NT or newer and software programs, and their proper versions required for a functional RICS base station.
17. Current operation manuals for the computer, modem, and operating system(s).

Printer.--The printer shall be an inkjet type and include the following:

1. Prints minimum of 1440 x 720 dpi black and white and color on plain paper.
2. Uses standard US letter and legal paper size.
3. Be compatible with the system software and programs .
4. Print a minimum of 5 pages per minute in black and white and 3 pages per minute in color.

Irrigation Software.--The irrigation software shall provide the following:

1. Operate and be compatible with the operating system software installed on the base station computer.
2. Operate at least 800 remote field units.
3. Initiate communication with the field units by direct contact and a polling sequence or interrogation cycle.
4. Provide on-screen monitoring (real-time) of program operation.
5. Allow computer operator to create new irrigation schedules without interfering with the operation of the current program.
6. Include individual station operation of any field unit in real-time from the base station.
7. Provide an "Estimated Finish Time" calculation of the current irrigation programs.
8. Provide for both real-time and scheduled unattended downloading of program files, water factor adjustments, and stop and run commands to the field units.
9. Provide for both real-time and scheduled unattended uploading of field unit activities, and generate printed reports of these activities, including:
 - a. Total run time for each valve.
 - b. Provide water usage summary by station, controller, by manual and test, and by non-controlled use.
 - c. Subnormal or excessive flow rates recorded by the field unit.
 - d. Self-diagnostic reports of failures and alarms, including loss of field unit control and communication.
10. Maintain an on going record of the "field unit activities," including "total run time" for each valve."
11. Provide for manual entry of evapotranspiration (Et) data into the irrigation program.

Work Station.--The work station shall consist of a computer table and a printer table, both designed for the purpose, and a chair with integrally cushioned seat and back. The computer table shall be 725 mm high, 760 mm deep and 1510 mm wide, with adjustable floor glides for leveling, an adjustable keyboard area and a locking drawer unit consisting of top box drawer and deep file drawer. The chair shall be height adjustable from 400 mm to 510 mm and the backrest shall be height adjustable from 100 mm to 150 mm above the seat. The printer table shall be manufactured by the same company and be the same style as the computer table and shall be of sufficient size to hold the printer and paper. Work station equipment shall meet or exceed CAL-OSHA requirements.

Auxiliary Items.--Auxiliary items shall consist of cables, antennas, and other additional items necessary for a functional RICS base station.

Set Up.--The Contractor shall be responsible for setting up the base station and demonstrating that the base station is in operating condition and performs the functions specified.

FIELD UNITS.--Each field unit shall consist of an irrigation controller, communication equipment, remote control valve actuator system, and vandal resistant antenna .

Field units shall monitor main line flows when operating with, or independently of, the base station.

Irrigation controllers shall provide the following features:

1. An output that can energize a remote control valve (master) in addition to the normal stations.
2. Flow sensor.
3. The field unit shall perform all functions requested as a stand-alone unit without the intervention of the base station and software or additional hardware.
4. Provide manual operation. Manual operation shall allow cycle start at any desired station and shall allow activation of a single station.
5. The station number and watering time of the station currently operating shall be displayed on the face of the control panel.
6. Be programmable to monitor flow rate to allow selection of:
 - a. A set high flow limit and a set low flow limit
 - b. Learned flow capability
 - c. Provisions for supply line fill time

d. Continuous mainline break detection during programmed irrigation and during non-irrigation time. The controller shall provide the ability to learn the flow rates of the valves during normal operation.

7. Closing of remote control valve (master) and remote control valves when flow rates are exceeded on main lines or through remote control valve (as determined by operator-entered parameters). When an excess high flow is determined by the field unit, the field unit shall conduct a series of test steps to determine one of the following and take the corresponding action:

a. For a mainline break or stuck open remote control valve: The entire irrigation system shall be shut down.

b. For a lateral line break: The current operating remote control valve shall be shut down and the irrigation program shall go on to the next scheduled remote control valve.

8. A time delay feature by the program shall prevent an instantaneous response to a temporary flow surge at start-up of irrigation.

9. The following field unit alerts (alarms) shall be logged at the field unit and uploaded to the base station upon request of the base station in real-time and scheduled unattended time:

a. A "Low Flow" alert when the actual flow is less than the low flow limit and the supply line fill time has passed.

b. A "High Flow" alert when the actual flow is greater than the high flow limit and the supply line fill time has passed.

c. A "No Flow" alert when there is no actual flow detected and the supply line fill time has passed.

d. An "Under Current" alert when an output is not drawing enough power.

e. An "Over Current" alert when an output is drawing too much power.

f. A "Short Detected" alert when a direct short to ground is detected on the output.

g. An "Over Budget" alert when the current irrigation program will exceed a user entered water budget for the current month.

All alerts (alarms) shall be date and time stamped with the date and time of the actual alert.

10. The field unit and the low voltage output source shall be protected by fuses or circuit breakers.

11. The flow sensors shall connect to the controller without the use of additional conversion modules and/or decoders.

12. Where direct burial conductors are to be connected to the terminal strips, the conductors shall be connected with the proper size open-end crimp-on wire terminals. No exposed wire shall extend beyond the crimp of the terminal and the wires shall be parallel on the terminal strip.

13. The field unit shall have a nonvolatile memory for program storage.

14. A lithium battery or a rechargeable battery back-up to keep the clock running and prevent loss of data in the event of a power failure.

15. Menus shall be displayed in English or Spanish. Programming instruction and key usage help shall be built into the field unit.

16. The field unit shall have a minimum of an 8 line by 40 character backlit display. The field unit shall provide for station descriptions to be entered at the field unit with a laptop computer or through the base station. The area description shall be up to 40 characters of text to describe the type of plant material, location and/or equipment used.

17. Provide water budgeting. Water budgeting is defined as the ability of the field unit to have water usage budgeted by month. The actual usage will be compared to the budget amount. In the event that the balance of the programmed irrigation for the month will exceed the budget, the field unit will notify the user of being "Over Budget." The user will have the ability to input the water budget into the field unit by one of the following methods:

a. Allow the field unit to calculate the water consumption based on historical evapotranspiration (Et), area and actual flow rate of each station.

b. Allow the user to input actual water budget numbers by month.

c. Allow the user to input a single water budget number for the year and the controller allocates the usage by month.

18. The field unit shall have historical Et tables built in. This historical Et will be used to automatically adjust irrigation run times.

Irrigation controller enclosure cabinets and rain sensor units: attention is directed to "Irrigation Controller Enclosure Cabinet" elsewhere in these special provisions.

Remote control valve actuator system: attention is directed to "Remote Control Valve Actuator System" elsewhere in these special provisions.

Communication Equipment.--The communication equipment for the field units shall have a 2-way data communication link with the base station by digital radio as described under base station communications elsewhere in this special provision.

Inputs and outputs of the communication system shall be lightning, transient and surge protected, including all power, antenna and control connections.

MANUFACTURER/SUPPLIER SUPPORT.—The remote irrigation control system equipment shall be responsible for the following system support work:

1. Conduct on-site system familiarization meetings for the Contractor to insure that employees understand the system installation.
2. Provide on-site system assistance during the installation period when requested by the Contractor or the Engineer.
3. Verify that all equipment is properly grounded.
4. Provide written certification that the equipment conforms to and is installed in accordance with the plans, these special provisions and the manufacturer's recommendations.
5. Test all system components for proper operation.
6. Verify the system flow range.

TRAINING.--Personnel training shall consist of a minimum 60 hours of classroom and field training for 4 personnel on the use and adjustment of the base station equipment (including software) and field units. The training shall be conducted over 8 consecutive working days, unless otherwise permitted by the Engineer. One complete set of training documentation and training aids shall be provided to each trainee and 2 sets to the Engineer (if videos are included in the training sessions, only one video tape copy will be required) and the training material shall become the property of the State.

The State will provide space for the training, including chairs and tables. Any other required training aids will be the responsibility of the Contractor. At the option of the Contractor, the training facility may be provided at a facility of the Contractor's choice, that is, within 50 km of the project location or of the Office of the District Director of the Caltrans District in which the project is located.

MEASUREMENT AND PAYMENT.--Quantities of base stations to be paid for will be measured by the unit determined from actual count in place.

The contract unit price paid for base station shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing the base stations, including training, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

Quantities of field units to be paid for will be measured by the unit determined from actual count in place.

The contract unit prices paid for field unit shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing the field unit, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-2.05C FLOW SENSOR

Flow sensors shall be capable of functioning on 75 mm pipe and shall consist of the flow sensor and valve box with wire mesh and gravel as shown on the plans.

The flow sensor body shall be constructed of Schedule 80 polyvinyl chloride (PVC). The impeller shall be a 6 blade design with a non-magnetic sensing mechanism and shall be manufactured of glass reinforced nylon. The flow sensor shall operate to a maximum pressure of 0.7 MPa.

The flow sensor shall have a pulsing output that operates at 9 volts direct current and at a pulse rate that is proportional to the flow in liters per minute. The flow sensor shall have a 0.067-amp fusible link to protect the metering insert. The flow sensor shall be powered by each field unit signals through control and neutral conductor wires specified elsewhere in these special provisions. The flow sensor shall be manufactured by the same company as the irrigation controller.

The flow sensor shall be installed in a valve box as shown on the Standard Plans except that plastic pipe supply line shall be connected to the sensor in a straight pattern to a minimum length of 1500 mm from the inlet and outlet sides of each flow sensor without any fitting located within this distance except for the flow sensor mounted tee.

The contract price paid for 75 mm flow sensor shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in installing each flow sensor, including valve box, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

ARMOR-CLAD CONDUCTORS.--Armor-clad conductors shall be used in direct burial applications from pull boxes adjacent to irrigation controller enclosure cabinets to remote control valves and other irrigation facilities in accordance with the details shown on the plans and these special provisions.

Armor-clad conductors shall conform to the following:

1. Conductors shall be the proper size for the application, and shall be solid, uncoated copper with a conductor size of not less than 90 percent of the AWG diameter required.
2. Conductor insulation coverings shall be manufactured of polyvinyl chloride (PVC) conforming to UL style, Type UF 60°C, 600 V. Average thickness of insulation shall be not less than 1.52 mm with a minimum thickness of 1.37 mm at any one point.
3. Armor shall be a minimum of 0.13-mm thick by 12.7 mm wide, Type 304 stainless steel tape that is helically wrapped over each conductor with a 33 percent minimum overlap.
4. Outer jacket for conductors shall be sunlight resistant PVC and shall conform to the Insulated Power Cable Engineer's Association (ICEA) S-61-402, NEMA Standard WC5, and UL Listing 1263. Nominal thickness of the outer jacket shall be 0.76-mm with a minimum thickness of 0.61 mm at any one point.

10-2.05D REMOTE CONTROL VALVE ACTUATOR SYSTEM

A remote control valve actuator system shall consist of a receiver mounted within each field unit cabinet, a receiver antenna mounted on the top surface of each field unit cabinet, two hand held transmitters, carrying cases, an AC power charging unit and receiver connector. The remote control valve actuator equipment shall be fully compatible with the irrigation controller. The receiver and transmitter shall comply with Federal Communications Commission (FCC) Rules and Regulations, Part 15, as of the date of manufacture.

The receiver connector shall be attached directly to the controller through the use of a 9-pin serial port on the front of the field unit or attached internally directly to the field unit.

The receiver shall be capable of operating the stations of the irrigation controller on radio signals from the transmitter. The receiver shall be capable of receiving radio signals a minimum distance of 1.6 km.

The transmitter shall be capable of providing a 2-way FM, radio signal for a minimum range of 1.6 km to the receiver located within each field unit enclosure cabinet. The transmitter shall have a digital key pad and be capable of instant actuation of the stations or master valves in random, numerical or reverse numerical sequences. The transmitter shall be capable of allowing for manual control and two way voice communication. The transmitter shall be capable of operating the master valve independently of the controller stations. The transmitter shall be capable of transmitting an FM radio frequency in the 150-174 MHz range.

The power source for the transmitters shall consist of an internal charged battery pack which shall be recharged by the charging unit. The charging unit shall have an input of 110 V AC, and an output of 12 V DC.

The receiver and antenna shall be furnished and assembled on and within each field unit cabinet prior to on-site installation. The antenna shall be vandal resistant as recommended by the manufacturer of the remote control valve actuator system.

Full compensation for the remote control valve actuator system shall be considered as included in the contract price paid for the field unit involved and no additional compensation will be allowed therefor.

10-2.05E IRRIGATION SYSTEMS FUNCTIONAL TEST

Functional tests for the remote irrigation controller system (RICS) and associated automatic irrigation systems shall conform to the provisions in Section 20-5.027J, "Testing," of the Standard Specifications and these special provisions.

Two functional tests shall be performed, one without and one with connection to the RICS base station. Both tests shall consist of demonstrating to the Engineer, through one complete cycle of the irrigation controllers in the automatic mode, that the associated automatic components of the irrigation systems operate properly.

Associated automatic components for both tests shall include, but not be limited to, new remote control valve actuator systems, irrigation controllers, remote control valves, conductors, flow sensors, and rain sensors. Associated automatic components for the second test shall include, but not be limited to, new irrigation software programs, transmission systems and flow alarms for high, low, zero and maximum mainline flows.

The first test shall be done prior to planting the plants and consist of testing the irrigation controllers and associated automatic irrigation systems without connection to the RICS base station. Upon completion of a satisfactory functional test, and correction of any deficiencies, the plants to be planted in the areas watered by the irrigation system may be planted, provided the planting areas have been prepared as specified elsewhere in these special provisions.

The second test shall be done prior to the start of plant establishment and consist of testing the irrigation controllers (field units) and associated automatic irrigation systems with connection to the RICS base station. As part of the second test the Contractor shall submit a RICS watering schedule for each irrigation controller (field unit) to the Engineer. The Engineer will enter the watering schedule into the irrigation software program, and a computer printout will be made available to the Contractor for verification. If the Engineer determines the submitted watering schedule is unacceptable, the Contractor shall submit a revised watering schedule to the Engineer for approval within 5 working days. Also as part of the second test the Contractor shall demonstrate to the Engineer that the RICS base station detects and reports the high, low, zero and maximum mainline flow alarms. Upon completion of a satisfactory test, including correction of deficiencies, the plant establishment period may begin, provided planting work as specified elsewhere in these special provisions has been completed except for plant establishment work.

If existing and new automatic components of the irrigation systems, including RICS base station components, fail a functional test, the components shall be repaired at the Contractor's expense and the testing shall be repeated until satisfactory operation is obtained.

Repair or replacement of existing irrigation facilities due to unsatisfactory performance shall conform to the provisions in "Existing Highway Irrigation Facilities" elsewhere in these special provisions.

10-2.05F IRRIGATION CROSSEOVERS (OPEN TRENCH)

Irrigation crossovers to be installed under existing surfacing shall include conduits, water line crossovers, sprinkler control crossovers and appurtenances, and shall be installed in accordance with the details shown on the plans and these special provisions.

Conduits shall be installed in open trenches and shall conform to the provisions in Section 20-5.03B, "Conduit for Water Line Crossovers and Sprinkler Control Crossovers," of the Standard Specifications.

Conduits shall be corrugated steel pipe.

Sprinkler control crossovers shall conform to the provisions in Section 20-5.027D, "Sprinkler Control Crossovers," of the Standard Specifications.

Conduits to be installed under existing pavement shall be installed in a trench approximately 300 mm wider than the outside diameter of the conduit to be installed. The top of the installed conduit shall be a minimum of 300 mm below finished grade.

Where no joint exists in a monolithic concrete ditch, the ditch shall be cut on a straight neat line at the location designated by the Engineer.

The outline of areas of surfacing to be removed shall be cut with an abrasive type saw or a rock cutting excavator specifically designed for this purpose. The minimum depth of cuts in asphalt concrete and portland cement concrete shall be 50 mm. Cuts shall be neat and true with no shatter outside the removal area. Removed asphalt concrete, portland cement concrete, and surplus excavated material shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Backfill for trenches shall be structure backfill conforming to the provisions in Section 19-3.06, "Structure Backfill," of the Standard Specifications.

The compacted thicknesses of the replacement underlying material, asphalt concrete and portland cement concrete shall be not less than the thickness of the respective material removed as specified above. The finished surface of the asphalt concrete and portland cement concrete shall be flush with the adjacent surface.

Asphalt concrete for replacing removed asphalt concrete surfacing and facilities shall conform to the following requirements:

1. Asphalt concrete shall be produced at a central mixing plant.
2. Paving asphalt and aggregates shall be commercial quality.
3. The amount of asphalt binder to be mixed with the aggregate shall be between 5 percent and 10 percent by mass of the dry aggregate. The exact amount will be determined by the Engineer.
4. The aggregate shall have a Sand Equivalent value of not less than 30.
5. The aggregate shall conform to the 9.5-mm maximum grading specified for Type B asphalt concrete in Section 39-2.02, "Aggregate," of the Standard Specifications.
6. A Certificate of Compliance shall be furnished to the Engineer in accordance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

Asphalt concrete shall be spread at a temperature of not less than 121°C. Asphalt concrete shall be spread and compacted by any method that will produce an asphalt concrete surfacing of uniform smoothness and texture.

Asphalt concrete placed in trenches may be placed in one layer provided the compacted thickness is 76 mm or less.

Asphalt concrete shall be thoroughly compacted. Where practicable, asphalt concrete shall be rolled with power rollers. Where the power rollers cannot be operated, compaction shall be obtained by hand rollers or an impactor.

Portland cement concrete for replacing removed concrete facilities, as specified above, shall conform to the provision in Section 90-10, "Minor Concrete," of the Standard Specifications, except that the concrete shall contain not less than 350 kilograms of cement per cubic meter. Placing and finishing portland cement concrete for removed concrete facilities shall be performed by methods which will produce a concrete surface of uniform smoothness, color and texture equal to or better than the adjacent concrete surface.

Full compensation for water line crossover appurtenances, cutting, removing and disposing of existing asphalt concrete surfacing and concrete surfacing; excavation and backfill; replacing existing asphalt concrete surfacing and portland cement concrete surfacing; and checking and pressure testing supply line pipe in conduit shall be considered as included in the contract price paid per meter for 150 mm corrugated steel pipe (1.63 mm thick) and 250 mm welded steel pipe (6.35 mm thick) and no separate payment will be made therefor.

10-2.05G PIPE

STEEL PIPE.--Galvanized steel pipe supply lines installed between water meters and backflow preventer assemblies shall be installed not less than 460 mm below finished grade, measured to the top of the pipe.

PLASTIC PIPE.--Plastic pipe supply lines shall be polyvinyl chloride (PVC) 1120 or 1220 pressure rated pipe with minimum pressure ratings (PR) as shown on the plans and as specified in these special provisions.

Plastic pipe supply lines shall conform to the requirements of ASTM Designation: D 1785.

Plastic pipe supply lines shall have solvent cemented type joints. Primers shall be used on the solvent cemented type joints.

Plastic pipe supply lines (mainlines) located upstream from remote control valves shall have a minimum pressure rating (PR) of 315.

Solvent cement for plastic pipe supply lines shall conform to the requirements of the local Air Quality Management District.

10-2.05H WATER METERS

Water meters for the irrigation systems will be furnished and installed by the serving utility at the locations shown on the plans.

Upon receipt of a written request from the Contractor, the Engineer will make arrangements with the serving utility to install water meters. The State will pay the costs and fees charged by the serving utility for such installations.

Attention is directed to Section 20-4.06, "Watering," of the Standard Specifications. The Contractor shall make the arrangements for furnishing and applying water until the water meters have been installed by the serving utility.

10-2.05I BACKFLOW PREVENTER ASSEMBLIES

Backflow preventers shall be one of the approved reduced pressure principle devices listed by the California Department of Health Services, Division of Drinking Water and Environmental Management, 601 North 7th Street, MS 92, P O Box 942732, Sacramento, CA 94234-7320.

Pressure loss through the backflow preventers shall not exceed the following:

BACKFLOW PREVENTER SIZE (millimeters)	FLOW RATE (Liters per minute)	PRESSURE LOSS (kPa)
65	340	83

Backflow preventer assemblies shall be painted with a minimum of 2 applications of a commercial quality enamel paint. The color of the paint shall be light brown.

Full compensation for furnishing and installing galvanized steel pipe supply lines from water meters through the backflow preventers to plastic pipe supply lines shall be considered as included in the contract unit price paid for 65 mm backflow preventer assembly and no separate payment will be made therefor.

When backflow preventer assembly enclosures are specified, the portland cement concrete pads for the enclosures will be paid for as provided under "Backflow Preventer Assembly Enclosures" elsewhere in these special provisions.

BACKFLOW PREVENTER ASSEMBLY ENCLOSURES.--Enclosures shall be fabricated of structural steel angles and flattened expanded metal and shall be installed over backflow preventer assemblies on a portland cement concrete pad in accordance with the details shown on the plans. There shall be a 50 mm minimum clearance between the backflow preventer assembly and the backflow preventer assembly enclosure. The concrete pad shall extend a minimum of 50 mm beyond the outer limits of the backflow preventer assembly enclosure, unless otherwise shown on the plans and these special provisions.

Expanded metal for sides, ends, and top panels shall be fabricated from 1.9 mm (14-gage), minimum thickness, sheet steel. The flattened expanded metal openings shall be approximately 20 mm by 45 mm in size.

Expanded metal panels shall be attached to the steel frames by a series of welds, not less than 6.4 mm in length and spaced not more than 100 mm on centers, along the edges of the enclosures.

Enclosure door handles shall have provisions for padlocking in the latched position. Padlocks will be State-furnished as provided under "State-furnished Materials" elsewhere in these special provisions.

Enclosures shall be galvanized, after fabrication, in accordance with the requirements specified in Section 75-1.05, "Galvanizing," of the Standard Specifications.

Hold down bolt assemblies shall be galvanized and shall be installed when the portland cement concrete pad is still plastic. Nuts shall be hexagonal and washers shall be the lock type.

Enclosures shall be painted with one application of a commercial quality pre-treatment, vinyl wash primer and a minimum of one application of a commercial quality, exterior enamel for metal. The finish color shall be light brown.

Quantities of backflow preventer assembly enclosures to be paid for by the unit will be determined as units from actual count in place.

The contract unit price paid for the backflow preventer assembly enclosure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing backflow preventer assembly enclosure, complete in place, including constructing the portland cement concrete pad, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

TESTING BACKFLOW PREVENTERS.--Backflow preventers installed by the Contractor shall be tested for proper operation by a certified Backflow Preventer Tester.

The backflow preventer tester shall hold a valid certification as a Backflow Preventer Tester from the county in which the device to be tested is located, or if the county does not have a certification program for Backflow Preventer Testers, the tester shall have a certificate from one of the following:

1. The American Water Works Association.
2. A county which has a certification program for Backflow Preventer Testers.

Testing for proper operation shall conform to the provisions of the county in which the testing is being performed or, if these procedures are not available, the tests shall conform to the provisions in the latest edition of the Guidance Manual for Cross-Connection Control Program, which is available from the California Department of Health Services, Division of Drinking Water and Environmental Management, 601 North 7th Street, MS 92, P.O. Box 942732, Sacramento, CA 94234-7320, Telephone: (916) 327-4097 or (916) 323-6111.

Tests for backflow preventers shall be satisfactorily completed after installation of the backflow preventer assembly and before operation of the irrigation systems.

The Contractor shall notify the Engineer at least 5 days prior to testing backflow preventers.

One copy of the test results for each backflow preventer and a valid certification from the backflow preventer tester shall be furnished to the Engineer. Backflow preventers failing required tests shall be repaired or replaced at the Contractor's expense.

Backflow preventers shall be retested once each year after the satisfactory completion of the first tests throughout the plant establishment period.

Full compensation for testing the backflow preventers shall be considered as included in the contract unit price paid for the size of backflow preventer assembly involved and no separate payment will be made therefor.

Full compensation for retesting the backflow preventers shall be considered as included in the contract lump sum price paid for plant establishment work and no additional compensation will be allowed therefor.

10-2.05J SPRINKLERS

Sprinklers shall be the type, pattern and material and shall have the operating characteristics listed in the "Sprinkler Schedule" shown on the plans. Sprinkler Types A-6, A-7, and A-8 shall have a feature that will prevent the remaining water in the system from flowing through the sprinkler heads at the lower elevations, after the system has been turned off.

ANTI-DRAIN VALVES:--Anti-drain valves for Types A-6, A-7, and A-8 sprinklers shall be integral to the sprinkler head and shall provide protection against drain-out to a minimum of 400 kPa.

Anti-drain valves for Type C-2 sprinklers shall have 15 mm female pipe threads and shall be manufactured of polyvinyl chloride (PVC) plastic exterior housings. Anti-drain valves shall provide adjustable protection against drain-out between a minimum range of 35 kPa and 100 kPa. Anti-drain valves for Type C-2 sprinklers shall be installed in the type V riser with the top surface set 25 mm below finish grade.

Type V risers shall consist of 2 sections of prefabricated flexible hose.

Full compensation for furnishing and installing anti-drain valves shall be considered as included in the contract unit price paid for sprinkler (Type C-2) and no additional compensation will be allowed therefor.

10-2.05K FINAL IRRIGATION SYSTEM CHECK

A final check of the irrigation facilities, including the remote irrigation control system (RICS) shall be done not more than 20 working days prior to the acceptance of the contract.

Length of watering cycles for use of potable water from water meters for the final check of irrigation facilities will be determined by the Engineer.

Remote control valves and remote control valves (master) connected to irrigation controllers shall be checked for automatic performance when controllers are in the automatic mode.

Unsatisfactory performance of irrigation facilities installed by the Contractor shall be repaired and rechecked at the Contractor's expense until satisfactory performance is obtained, as determined by the Engineer.

Repair or replacement of unsatisfactory performance of existing irrigation facilities shall conform to the provisions of "Existing Highway Irrigation Facilities" elsewhere in these special provisions.

Nothing in this section, "Final Irrigation System Check," shall be construed as relieving the Contractor of full responsibility to make good or repair the defective work or materials found at any time before the formal written acceptance of the entire contract by the Director.

Full compensation for checking the irrigation systems prior to the acceptance of the contract shall be considered as included in the contract lump sum price paid for plant establishment work and no additional compensation will be allowed therefor.

SECTION 10-3. SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS

10-3.01 DESCRIPTION

Electric service (irrigation) and irrigation controller enclosure cabinets shall conform to the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and these special provisions.

10-3.02 COST BREAK-DOWN

The Contractor shall furnish to the Engineer a cost break-down for each contract lump sum item of work described in this Section 10-3.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and values shall be included in the cost break-down submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-down submitted for approval.

No adjustment in compensation will be made in the contract lump sum prices paid for the various electrical work items due to any differences between the quantities shown in the cost break-down furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

The sum of the amounts for the units of work listed in the cost break-down for electrical work shall be equal to the contract lump sum price bid for the work. Overhead and profit shall be included in each individual unit listed in the cost break-down, however, costs for traffic control system shall not be included. Bond premium, temporary construction facilities, plant and other items will not be paid for under the various electrical work items and shall be included in the mobilization bid item for the entire project.

The cost break-down shall be submitted to the Engineer for approval within 15 days after the contract has been approved. The cost break-down shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made.

The Engineer will use the approved cost break-down to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the item or items of electrical work due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost break-down, the adjustment in compensation may be determined at the Engineer's discretion in the same manner specified for increases and decreases in the quantity of a contract item of work in accordance with Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

The cost breakdown shall, as a minimum, include the following items:

- foundations - each type
- conduit - list by each size and installation method
- pull boxes - each type
- conductors - each size and type

10-3.03 CONDUIT

Conduit to be installed underground shall be Type 1.

The conduit in a foundation and between a foundation and the nearest pull box shall be Type 1.

After conductors have been installed, the ends of conduits terminating in pull boxes, and in service and controller cabinets shall be sealed with an approved type of sealing compound.

At locations where conduit is required to be installed under pavement and existing underground facilities require special precautions, as described in "Obstructions" of these special provisions, conduit shall be placed by the "Trenching in Pavement Method" as specified in Section 86-2.05C, "Installation," of the Standard Specifications.

At other locations where conduit is required to be installed under pavement and if delay to any vehicle will not exceed 5 minutes, conduit may be installed by the "Trenching in Pavement Method."

Conduit installed by "Trenching and Pavement Method" shall be Type 1.

10-3.04 PULL BOXES

Grout shall be placed in bottom of pull boxes.

10-3.05 CONDUCTORS AND WIRING

Splices shall be insulated by "Method B".

The minimum insulation thickness, at any point, for Type USE, RHH or RHW wire shall be 1.0 mm for conductor sizes No. 14 to No. 10, inclusive, and 1.3 mm for No. 8 to No. 2, inclusive. The minimum insulation thickness, at any point, for Type THW and TW wires shall be 0.69 mm for conductor sizes No. 14 to No. 10, inclusive, 1.02 mm for No. 8, and 1.37 mm for No. 6 to No. 2, inclusive.

10-3.06 ELECTRIC SERVICE (IRRIGATION)

Electric service (irrigation) shall be from the service points to the irrigation controllers (IC) and to the spaces provided in the irrigation controller enclosure cabinets (CEC) for irrigation controllers, as shown on the plans.

The types of service for the irrigation controllers and irrigation controller enclosure cabinets shall conform to the following:

IRRIGATION CONTROLLERS (IC).—Two single-pole, 15-A circuit breakers shall be installed in the existing 120/240 volt service equipment enclosure shown on the project plans. The circuit breaker shall be of the same manufacturer and model and interrupting capacity as the existing circuit breakers.

Electric service (irrigation) will be paid for on a lump sum basis.

The contract lump sum price paid for electric service (irrigation) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing electric service (irrigation) for irrigation controllers, complete in place, including conductors, conduit and pull boxes to the pull box adjacent to irrigation controller enclosure cabinets and irrigation controllers, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-3.07 IRRIGATION CONTROLLER ENCLOSURE CABINET

Irrigation controller enclosure cabinets (CEC) shall be constructed and the equipment within the cabinets shall be installed in accordance with the details shown on Standard Plan ES-4D, project plans, Standard Specifications, and these special provisions.

Cabinet dimensions shown on Standard Plan ES-4D shall be revised to 1500 mm in height, 900 mm in width, and 300 mm in depth.

Irrigation controller enclosure cabinets shall be fabricated in accordance with the provisions in Section 86-3.04A, "Cabinet Construction," of the Standard Specifications

Irrigation controller enclosure cabinets shall be fabricated of stainless steel.

Irrigation controller enclosure cabinet door handles shall be provided with vandal resistant covers over the locking device and shall have provisions for padlocking. Padlocks will be State-furnished as provided under "State-Furnished Materials," elsewhere in these special provisions.

The plywood mounting panel shall be 19-mm exterior AC grade veneer plywood. The panel shall be painted with one application of an exterior, latex based, wood primer and 2 applications of an exterior, vinyl acrylic enamel, white in color. The plywood panel shall be painted on all sides and edges prior to installation of the panel in the cabinet and equipment on the panel.

Inside of the doors shall have provisions for storage of irrigation plans.

Duplex convenience receptacles shall have ground-fault circuit interruption as defined by the Code. Circuit interruption shall occur on 6 mA of ground-fault current and shall not occur on less than 4 mA. Receptacles shall be installed in a weatherproof housing with rainproof lift covers.

Solid-state automatic shut-off rain sensor units shall be installed on the irrigation controller enclosure cabinets in the vandal resistant enclosures. Rain sensor units shall automatically interrupt the master remote control valves after approximately 3 mm of rain has fallen. The irrigation system shall automatically be enabled again when the accumulated rainfall evaporates from the rain sensor unit collection cup. Rain sensor units shall be rated 24 to 30 VAC. Static charge protection shall be included to protect against lightning damage.

The contract unit price paid for irrigation controller enclosure cabinet shall include full compensation for furnishing all labor, materials, tools, equipment (including rain sensor units), and incidentals, and for doing all the work involved in installing irrigation controller enclosure cabinets, complete in place (including constructing foundations and pads, conduits to pull box adjacent to cabinets, and installing equipment, within the cabinets, except for "Field Unit" equipment as specified elsewhere in these special provisions), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.